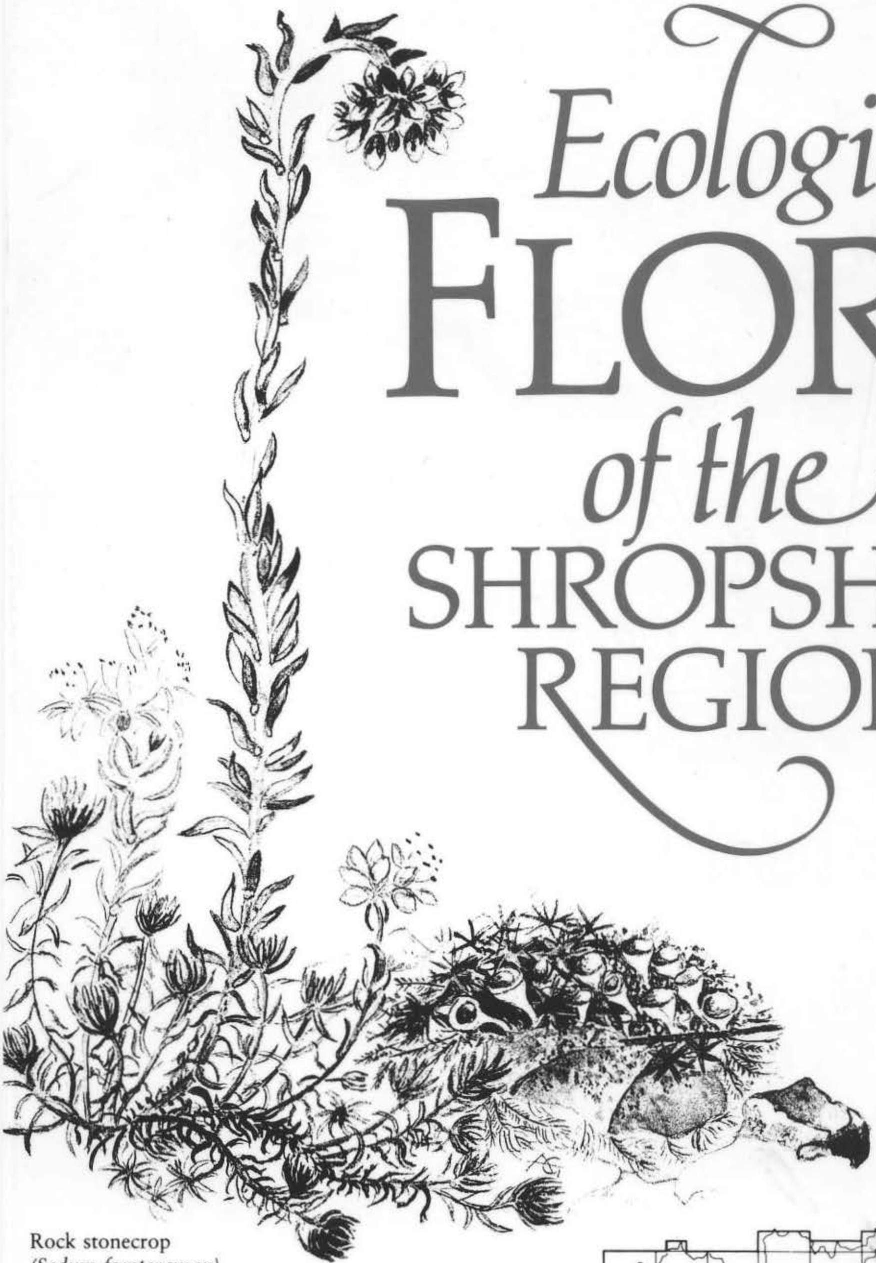
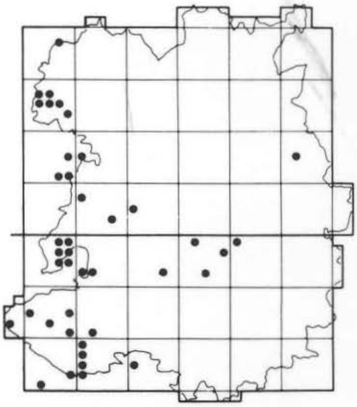
Ecological FLORA of the SHROPSHIRE REGION



Rock stonecrop
(Sedum forsteranum)



Sinker · Packham · Trueman · Oswald · Perring · Prestwood

ECOLOGICAL FLORA
# of the
SHROPSHIRE REGION

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With chapter headings by Lindsay Brown

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Produced in conjunction with Martin Walters and Geoff Green, Cambridge

To the late Miss Lily F Chitty,
and to past, present and future botanists,
in and around Shropshire,
the authors gratefully dedicate this book.

And the earth brought forth grass,
and herb yielding seed after his kind,
and the tree yielding fruit,
whose seed was in itself, after his kind;
and God saw that it was good.

Genesis: 1:12

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(Initials of authors mainly responsible for each Part or Chapter are given in brackets. Other contributors are mentioned in the Acknowledgements.)

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Foreword

I WAS first introduced to Shropshire by no less a field botanist than Francis Rose, and for many years was a regular visitor to Preston Montford Field Centre where Charles Sinker was then Warden; from there I walked its hills, woodlands, hedgerows and fields, and dabbled in its rivers, canals, mires and meres. It was in this fair county that I served an important part of my apprenticeship in the sodden world of peat.

It is a fabulous county whose botanical heritage, though not as famous as some, is nonetheless very, very rich. It is above all a county which has, at least in the past, been well used, and it is still blessed today with many farmers and landowners who understand the importance of that heritage. This is, at least in part, due to three factors:

1 The high standard of real education in its deservedly famous schools.
2 The presence of one of the Field Studies Council's premier Field Centres.
3 The work of the Nature Conservancy Council's regional office, first headed by Tom Pritchard, at Attingham Park.

This book lays that heritage on permanent record in this momentous year of 1984 when so much of Britain's wildlife heritage is under massive threat.

This is no ordinary Flora, no simple list of plants: it overflows with the knowledge of experts who are able to communicate their own excitement in the subject. It recognises and describes plants as living members of living communities with which we must learn to share the countryside.

It is about ecology, a study of the 'home' of all Salopians whether plant or animal. It is an important work of scholarship – geology, botany, geography, ecology and history all in one – a Domesday Book for Shropshire against which all future change will be measured.

David J. Bellamy
Bedburn
1984

Preface

A LIVELY sketch of lesser celandine gleams on my desk as I sit down to write this Preface. It was drawn by Clive James, aged nine, a pupil of Burwarton Primary School. His coloured portraits of spring flowers also include marsh marigold, greater stitchwort, bluebell and red campion; they were a charming and unsolicited bonus when his school responded to a survey of first flowering dates in 1984. The purpose of the phenological survey, organised for the Flora by the Shropshire Trust for Nature Conservation with the help of selected schools and individuals, was to discover any significant variation in the onset of spring flowering at different altitudes within the Shropshire Region.

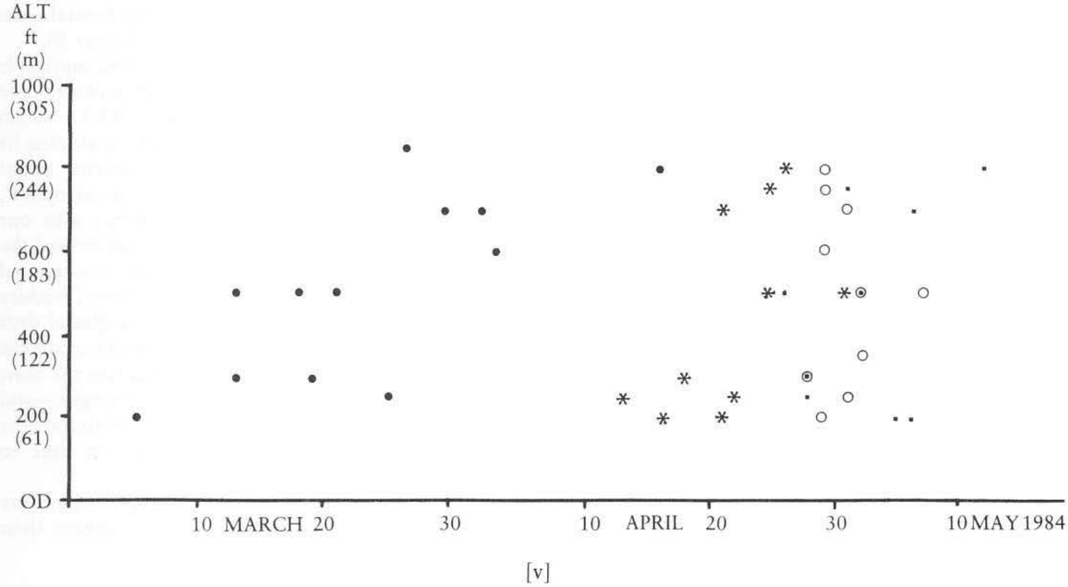
The results for four species are summarised in the diagram at the foot of this page; those for marsh marigold showed no discernible pattern. The diagram's vertical axis gives the height above sea level of the place of observation, to the nearest 50 feet (15m). The horizontal axis indicates the dates on which three fully-open flowers on separate plants of the same species were first seen.

It was a long, cold early spring, apart from two or three days of warm sunshine at the beginning of March. Lesser celandine (black spots on the diagram), which flowered in exceptional profusion this year over an extended period, started on 5 March at 200ft in a warm and sheltered spot, climbing at a leisurely pace to its 'last first' flowering more than a month later (16 April) at about 800ft altitude. Greater stitchwort (asterisks) showed a similar trend, but later and over a much shorter period.

Bluebell (open circles) and red campion (small black squares) showed no significant correlation with altitude: both burst into a profligate flush of bloom towards the end of April, when uplands and lowlands alike began to bask in an almost Mediterranean spell of hot, dry, sunny weather. Everything seemed to flower at once, everywhere, as though the world were about to end in a blaze of blossom. It was the most beautiful late spring I can remember, and I was chained to my desk indoors.

The same diagram might almost serve to illustrate progress in the preparation of this Flora: a leisured and fairly orderly period of eight years, during which a great deal of information was collected and collated, suddenly gave way to those few final urgent months when everything needed to be done instantaneously and simultaneously.

The enthusiasm shown by the children at Burwarton and other schools in the recent survey is typical of the Flora project as a whole. How much of this is due to innate curiosity, and how much to rural tradition? Do country children today know greater stitchwort by any of its old Shropshire names – bogey's playthings, crackers, pop bladders, May-grass, my



Lady's needlework, devil's corn or skitty witty? Do they still call red campion Jesus' blood, scalded apple or thunderflower? Vernacular plant names recall the wit, ribaldry and recreations of our forebears, as well as their tastes, beliefs and superstitions.

People born and raised in farming families can be – though not all of them are – observant and knowledgeable in ways for which formal education is no substitute. It was the austerely practical wisdom of subsistence ecology that informed the old Welsh farmer's saying:

Dan yr eithin, aur; dan y rhedyn, arian; dan y grug, plwm.*

When he spoke thus of "gold under gorse; silver under bracken; lead under ling", he was not speculating about the mineral wealth of his land but recognising that wild plants could indicate the potential productivity of its soils.

I was introduced to 'serious' botany – Latin as well as folk names – by Mrs Honor Pendlebury (née Leeke), though nobody could remain serious for long with so entertaining a guide (see *Veronica filiformis* in Chapter 10). She was one of a small crew of enthusiastic local amateurs who kept Shropshire's natural history afloat and moving through the long doldrums between the Wars, when the keen winds of scientific biology blew only round the towers and spires of distant universities. Honor and most of her fellow-enthusiasts were members of the Caradoc and Severn Valley Field Club; the club's most distinguished member latterly was Miss L F (Lal) Chitty – archaeologist of international repute, naturalist, local historian, folklorist and raconteuse of racy tales in Shropshire dialect. It was through her good offices, and from her family, that in 1964 the Shropshire Conservation Trust acquired its first nature reserve at Earl's Hill near Pontesbury, where she lived for so long. When it was suggested that this book be dedicated to her memory, we were more than happy to agree.

The extent and pattern of interest in natural history have changed dramatically since World War II. Television and the press have played an important part, as have the scientific and educational activities of such bodies as the Nature Conservancy Council, the Royal Society for Nature Conservation and the Field Studies Council. The words 'conservation' and 'ecology' are now common currency, and a significant minority even know what they mean. Biology, in its outdoor aspects, is immensely popular in schools and colleges: more students take environmental degrees than will ever find environmental jobs of a permanent and satisfying nature. Young teams of temporary workers, under a succession of worthwhile schemes set up by the Manpower Services Commission and labelled with confusing acronyms, have gone out into the field and brought about a quiet revolution in practical conservation and site surveys.

Set in this recent historical perspective, the origins and aims of the Shropshire Flora project are described in Chapter 1. It has taken us almost ten years to produce this book. We, the six author-editors, were all lucky enough to be employed in demanding and responsible posts: in my own case, I was only able to give enough time to my part in the work as a result of taking early retirement at the end of 1983. Since then it has proved an absorbing full-time occupation.

The result can be weighed in the reader's hands. It is at least three books in one; for each of us held, and held strongly, his own view of what it was to be about. The early editorial meetings were amicable, protracted and contentious; the inevitable outcome was agreement to include rather than exclude. All of us, of course, wanted to produce a Flora which could be compared with Leighton's of 1841 – and could stand up to such comparison. Some felt that an updated catalogue of the geographical distribution of plant species was our principal aim, with numerous dot-maps as illustrations. For this we had Perring and Walters's *Atlas of the British Flora* as a splendid model – and one of its editors is also one of us. Others, mindful of their academic responsibilities, wanted to incorporate a modest but reasonably comprehensive text for students of descriptive plant ecology, using computer-analysis of samples from the exceptional variety of vegetation types, soils and geology which the region has to offer. Personal obsessions have also been temporarily lulled by writing the series of biographical sketches of endemic and exotic Shropshire botanists (Chapter 2) and a brief review of ecological change and the factual basis of priorities in nature conservation (Chapter 9).

Ecological change – both avoidable and inevitable – is of concern to more people today than at any time in the past. The quotation (*Isaiah* 35:7) which introduces Part One of this book is apt – including its touch of Welsh heraldry. Curiosity is intense about the possible causes of earlier 'eco-catastrophes', perhaps because we feel that our control over our own environment is so precarious. What caused the great dinosaurs to become extinct, that once roamed the red Triassic deserts of the Shropshire-Cheshire plain? That arid land is covered now by glacial drift hundreds of feet thick, in whose hollowed surface the meres and mosses nestle wetly: what drives the slow climatic cycles of the Quaternary, that brought – and may bring again – cold tongues of ice to obliterate the living landscape? We cannot go back in time to investigate such matters directly.

What we can do is to study changes which are taking place around us now and investigate their

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*I learnt the Welsh saying quoted above many years ago, from Tom Pritchard of the Nature Conservancy. Mike Gash has kindly drawn my attention to a different version used by W M Condry in his excellent book *The Natural History of Wales* (Collins, London 1981): in translation, it reads "Gold under bracken, silver under gorse, copper under heather." Old proverbs should be treated with respect – *plant gwirionedd yw hen ddiarhebion* – but even the children of truth can disagree.

possible causes – acid rain, eutrophication and other less fashionable and even more complex agencies equally worthy of our attention. Living (and dying) plants can provide us with particularly valuable evidence – "grass" is a well-chosen word for an informer – because they stay in one place and act as recording instruments of all that influences them.

The neatest definition of plant ecology is "the study of what grows where, and why"; if we add "and when, and how, and how much", we have a subject providing elements of interest for almost anyone – not just the dedicated botanist but the farmer and the forester, the planner and the engineer, the weekend gardener and the country-lover. That is why ecology runs as a strong thread right through the book, to hold the interest even of those for whom plant-names are as meaningless as beads. It is also the reason, in several chapters, for confining the Latin names to the right-hand margin in order not to interrupt the narrative flow of the text. The authors are aware that some aspects of their subject make easier reading than others, but we have done what we can to help the non-specialist reader.

Right or wrong, we were united in our decision to adopt the 'Shropshire Rectangle', with its minor protrusions, as our territory, and to avoid the sterile debate between the advocates of grid-based and vice-county-based local Floras. One of our reasons was the high interest and importance of the part of Montgomeryshire adjoining Shropshire on its western marches – an area which at that time seemed very unlikely to be the subject of its own local Flora in the foreseeable future. We have had our critics: "untidy" said some; "confusing"; "tactless and chauvinistic". " 'Greater Shropshire', indeed!" growled one Welshman; "I'd make it the East Riding of Powys if I could!" In 1984, as a direct and ironic result of the excellent teamwork by Welsh and English participants in the Shropshire Flora survey, a new project was launched in y Trallwng – Welshpool – to survey the flora of Montgomeryshire using the same methods.

Of course there is a great deal that we have been unable to do, and much that we should have done otherwise, given time or the wisdom of hindsight. We much regretted not being able to include mosses and other non-vascular plants in the Flora proper (Part Three), though they figure in the ecological accounts in Part Two. We should also have liked to relate our own local work to the authoritative ground-plan of the National Vegetation Classification, had the latter been published in time. Some of us still recall with grateful appreciation a memorable course on Phytosociology organised by David Bellamy and run by the late Professor Reinhold Tüxen at Preston Montford Field Centre in 1968.

No outstanding botanical discoveries have resulted from the project, but we all feel we know our region a little better. There is the usual welter of unanswered questions and last-minute finds. Where has all the danewort gone? Why are the hedges round the lead-miners' smallholdings near Shelve so full of laburnum? How is it that, within a few years of the closing down of a clay working at Stoneyhill in Telford, no less than three species of clubmoss have appeared on spoil-heaps there? The most difficult thing about writing a Flora is knowing when to close the door to new information. It is closed now.

Charles Sinker
Mytton
Shrewsbury
July 1984

Acknowledgements

THIS HAS been, at all stages, a co-operative enterprise. Many organisations and individuals have been involved in the preparation of the Flora, and the author editors would like to express their appreciation for the immense amount of help which they have been given and the generosity with which people have made their time, energy, knowledge and skills available.

A list at the end of Chapter 1 gives the names of the many botanists, mostly amateur, whose sustained enthusiasm contributed the bulk of the records on which this book is based. It would be impossible for us to thank them adequately: we hope that the fieldwork was some reward in itself, and that publication of their findings may add to that pleasure. We were heartened by the goodwill and co-operation of landowners, farmers and others, who, with rare exceptions, granted us unrestricted access to their land.

We are especially grateful to the Shropshire Trust for Nature Conservation (formerly the Shropshire Conservation Trust) for undertaking to publish the book – an extra burden which Clive Tate, the Trust staff and members of various Manpower Services teams have shouldered cheerfully and without complaint. We also appreciate the financial support and encouragement of the Caradoc and Severn Valley Field Club and the Montgomeryshire Field Society. Particular thanks are due to an anonymous trust for its exceptionally generous grants and loan towards this project; without these we could not have contemplated publication.

Among the many organisations which have freely contributed their services to the Flora are the Field Studies Council, its Director's office (Paul Croft and Linda Horton) and Preston Montford Field Centre (Adrian Bayley); the West Midlands Regional Office of the Nature Conservancy Council; Shropshire County Council; Telford Development Corporation; the University of Birmingham Department of Extra-mural Studies (Dr Robert Cameron and Dr Peter Toghill); and especially the Polytechnic, Wolverhampton: we owe debts of gratitude to Dr Fred Webber, Head of the Department of Biological Sciences, for his support and encouragement over many years; to Mr C Boyd and the print room staff; to John Woodfield of the computer centre; and to the secretarial and technical staff more personally acknowledged below.

An invaluable contribution has been made, both in identification and in the provision of records, by BSBI referees and other outside experts and specialists – in particular Peter Benoit (various taxa including hybrids); Jim Bevan and Peter Sell (*Hieracium* etc); Eric Clement (aliens); Alan Newton and Eric Edees (*Rubus* and Staffordshire records); Tom Edmondson and Dr John Richards (*Taraxacum*); Gwynn Ellis (Welsh records); Dr Nigel Holmes (aquatic *Ranunculus*); Clive Jermy (*Lycopodium* etc); Douglas Kent (herbaria); Dr J T H Knight (*Epipactis*); Chris Preston (data from the Biological Records Centre at Monks Wood); and Dr Peter Yeo (*Euphrasia*). Vivien Bellamy, Museums Curator at Rowley's House Museum, let us delve into the Shrewsbury Herbarium.

Records have also been made available to the Flora from the Nature Conservancy Council, and we are grateful to the Assistant Regional Officer for Shropshire, Chris Walker; to Dr Tim Bines, leader of the England Field Unit, and to Ian Bolt, Martin Wigginton and Dr Peter Welsh for data from NCC surveys of ancient woodlands, meres and grasslands in Shropshire. The grasslands survey contributed a number of quadrat records to the computer analysis in Chapter 6, and we were also allowed to see National Vegetation Classification data.

Several other people have made important personal contributions: we particularly appreciate the interest which David Allen has taken in Chapter 2, and his expert help with the biographical material. Marjorie Wainwright carried out detailed research on Edward Lhwyd, and Joan Connell supplied useful information from the libraries of Shrewsbury School and the Caradoc and Severn Valley Field Club; other members of the Flora project team were helpful in various ways, and Antony Herbert and John Powell of the Ironbridge Gorge Museum Trust gave us access to William Anstice's botanical records.

Much of the section on climate (3.2) was drafted by M A Fullen, J P Smith and D J Mitchell of the Geography Section at the Polytechnic, Wolverhampton; Dr A H Reed, of the same Section, wrote most of the contribution on land use (3.5). Paul Moxey (Field Studies Council) kindly obtained information from Professor Alice Coleman's Second Land Utilisation Survey, Dr Peter Toghill made constructive criticisms of the geology section (3.3) and contributed to the diagrams. We are especially grateful to Paul Burnham, who not only commented on the soils section (3.4) but also revised the relevant tables and diagrams for us. Chris Walker contributed substantially to the writing of Chapter 7.

We want to thank those who have allowed us to use copyright material and figures already published elsewhere: the editor of *Field Studies* as well as Paul Burnham, Peter Toghill and Keith Chell; Dr John Birks (Table 9.1); David Pannett (Fig. 7.5); the

University of Cambridge Committee for Aerial Photography (aerial photographs).

Certain members of the project team voluntarily undertook a quite disproportionate amount of the preparatory work, and our gratitude to them is correspondingly great: Helen Davidson, helped initially by Joyce Lee, not only collated all the 'B' species records; she also drew the many thousands of dots on all the contemporary (i.e. non-historical) distribution maps in Chapter 10. Dr Diana Kingham took responsibility for compiling all the 'C' species records in the form of a card index, until she left the region and was obliged to relinquish this task. They have both read parts of the book in draft and made helpful and critical comments, as have Professor Arthur Willis, Audrey Ashwell, Dr Jenny Baker, Peter Benoit, Dr David Harding, Eric Howell, Doris Pugh, Sarah Stafford, Marjorie Wainwright, Chris Walker, Dr and Mrs Len Warren: we thank them all.

The appearance of this book is much enhanced by the specially-commissioned paintings and drawings, and parts of its text clarified by maps and diagrams. Anne Gilbert painted the eight colour plates and the dust-jacket illustrations, with the indispensable help of her late husband, Don. Lindsay Brown drew the chapter heading illustrations. Pat Wolseley did several of the text-figures. David Dennison prepared, revised and corrected numerous maps and diagrams; Rebecca Sinker was responsible for nine of the maps in Fig. 3.2 and all of those in Chapter 9. We should also like to thank Dr Jenny Baker for producing five of the diagrams in Chapter 3 and Dr John Dony for the vice-county map (10.1).

Odette Murray took on the tedious jobs of compiling the index and collating the gazetteer entries, as well as giving generous help with Chapter 10. Pat Parker and Rex Ingham have also put us in their debt by helping out at critical times.

We are grateful to Miss L Sanderson, Mrs J Simcock, Mr S Perry, Mrs T Eames and Mrs N Shaw for their assistance in checking the data used in the computer analysis.

Shirley Smith, Linda Horton, Kathryn Hockenhull, Jess Owen and Sallie Cooper typed various parts of the text, patiently enduring several revisions.

Tim Pridgeon has won our deep respect and appreciation for his skill, understanding and forbearance in preparing the Flora for publication.

Finally, our warmest thanks go to Margaret, Mary, Sylvia, Janet and Margaret, who have let Flora take first place for so long.

Charles Sinker,
John Packham (executive editor),
Ian Trueman, Philip Oswald,
Frank Perring, Will Prestwood
July 1984

Preface to the new edition

THE HARDBACK edition of *Ecological Flora of the Shropshire Region* was published in 1985 and sold out very rapidly, leaving an unsatisfied demand. For this reason we have decided to issue this reprint, reduced in size and sadly without the colour plates by Anne Gilbert which were such a valued feature of the hardback edition. It incorporates a number of minor corrections, but the only maps to be altered are those for *Populus nigra* and *Sagina nodosa*. We are grateful to all those who have drawn our attention to errors, and especially to Edgar Milne-Redhead for his help with *Populus nigra*. We also thank Martin Walters and Geoff Green for handling the arrangements for reprinting the Flora.

The printing of this edition has been entirely financed by the Leighton Fund set up with money donated by the same anonymous trust which supported the 1985 Flora and its preparation. It is not intended to modify it in the future, but the Shropshire Wildlife Trust and the BSBI Recorder for Vice-County 40, Ian Trueman, are continuing to update the floristic records. We hope that early in the 21st century there will be a third Shropshire Flora based on a new 'time-slice'.

Charles Sinker
Mytton
Shrewsbury
February 1991

Aerial photographs

(Cambridge University Collection: copyright reserved)

Introducing Part One (page xv)

(1947) Church Stretton gap, looking SSW; flanked on left (E) by Stretton Hills, the Lawley nearest; left of Lawley, Hoar Edge scarp comes into view, with Hope Bowdler Hill beyond; wooded scarp of Wenlock Edge tapers off in left distance, with Callow Hill beyond and View Edge to right. W of Church Stretton rises the Long Mynd plateau (behind it Radnor Forest just visible in far distance). Roman road from Viroconium (Wroxeter) swings up from bottom left, heading for Bravonium (Leintwardine), through arable farmland already showing signs of post-war prosperity and mechanisation. (Y 85)

Introducing Part Two (page 77)

(1948) Meanders of River Severn as it approaches Buildwas and Ironbridge Gorge, looking ESE; river is bordered by pastures liable to flooding; Cockshut Rough and Buildwas Park middle right, on hill behind them Tick Wood merging into Benthall Edge Wood at top centre. Severn Valley railway line from Shrewsbury (still in use at this date) curves up from bottom right, passing Buildwas Abbey ruins, and, just beyond them, small power station built before World War II. (AV 70)

Introducing Part Three (page 167)

(1952) Earl's Hill, looking NNE; less high Pontesford Hill, upper left, not yet afforested; inner ramparts of summit hill-fort (Iron Age) clearly visible, with outworks extending SSW to centre of picture. Most of hill heavily grazed, with evidence of intense rabbit activity: small whitish patches are bare soil of warrens; mid-slopes on right are bracken-covered (deeper soil) with scrub starting to invade (elder is in flower); lower slopes, middle right, carry mixed ashwood and lead steeply down to Habberley Brook whose valley (upper right) swings right past Earlshill Farm and Skin Mill ruins, then left again and out of picture top centre. Oaks Wood, on slope at upper right, not yet extensively felled and replanted, but has recent firebreak cut through it. (JB 84)

Following pages

Page xi (top)

(1973) Crose Mere, looking WSW; mainly surrounded by pasture (cattle visible in near field), with interrupted line of old alder and ash on NE shore (exposed to wave action under prevailing wind), narrow fringe of reedswamp at sheltered W end and on silty E shore. Sweat Mere, at bottom left, has almost ceased to be a mere: two small patches of open water remain, choked by lily-pads; reedswamp invasion has reached the middle; concentric zones of willow scrub and alder carr are closing in; taller trees mark the older, almost circular, shoreline before the water level was lowered in 1864 (for recent rate of change, compare 1960 photo in Sinker 1962). Whettal Moss, right, is a former peat bog drained and planted with conifers. [See Chapters 5 and 7]. (BNK 38)

Page xi (bottom)

(1973) Brown Moss, looking NNE; common land, with birchwood and heath surrounding shallow pools, one large and about eight smaller, whose water levels vary dramatically. Angling and other public recreation are difficult to reconcile with nature conservation in these fragile habitats, but Brown Moss remains one of Shropshire's most important sites. [See Chapter 5]. (BNK 24)

Page xii (top)

(1947) S end of the Long Mynd plateau, looking NNE; small rectangular fields (late inclosure) about Asterton and on the Prolley Moors lap against the slightly indented W scarp; deep valleys – 'batches' or 'hollows' – dissect the E side. Dry moor or heath covers most of this vast common, which is overgrazed by sheep. Now owned by National Trust. [See Chapters 5 and 6]. (Z4)

Page xii (bottom)

(1958) Catherton Common, looking WSW over Hill Houses towards the lonely unofficial enclosures of 'squatter' settlements at Crumpsbrook and Lubberland; the open common is cratered with bell-pits (old coal mines); interesting areas of dry and wet heath on middle left. [See Chapters 5 and 6]. (WR 2)

Page xiii (top)

(1968) Breidden Hill North Crags, looking SE; dolerite cliffs, steep gullies and partly wooded screes; pasture on summit, Forestry Commission plantations beyond. [See Chapter 6]. (AUK 16)

Page xiii (bottom)

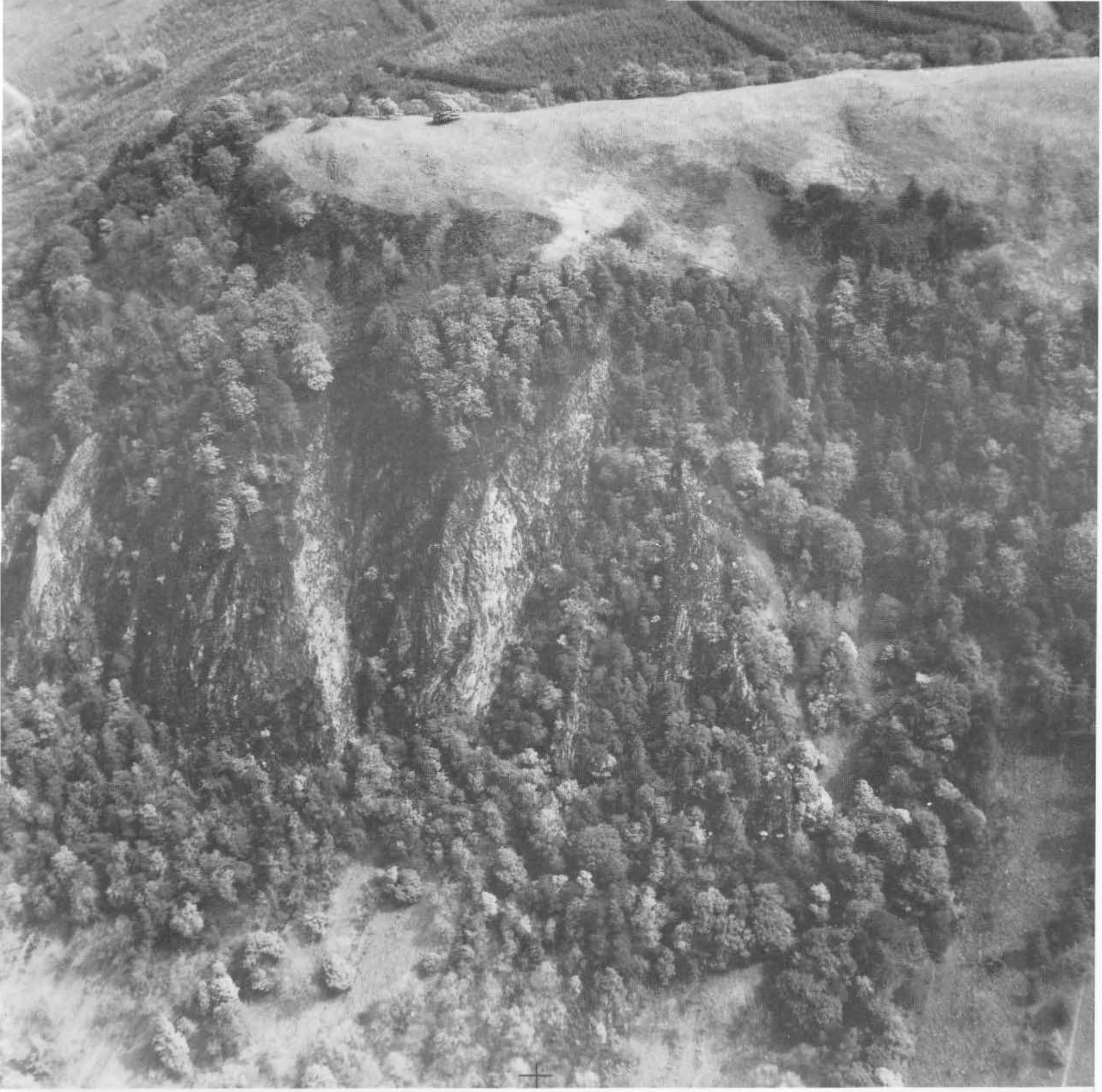
(1975) [Vertical photo, W at top, scale in metres approximate]. Stone stripes on the Stiperstones, just W from summit (Manstone Rock); dark areas are heather, lighter areas quartzite boulders. Ground slopes down at c 10° from bottom to top of picture. [See Chapter 6]. (RC 8–0 56)

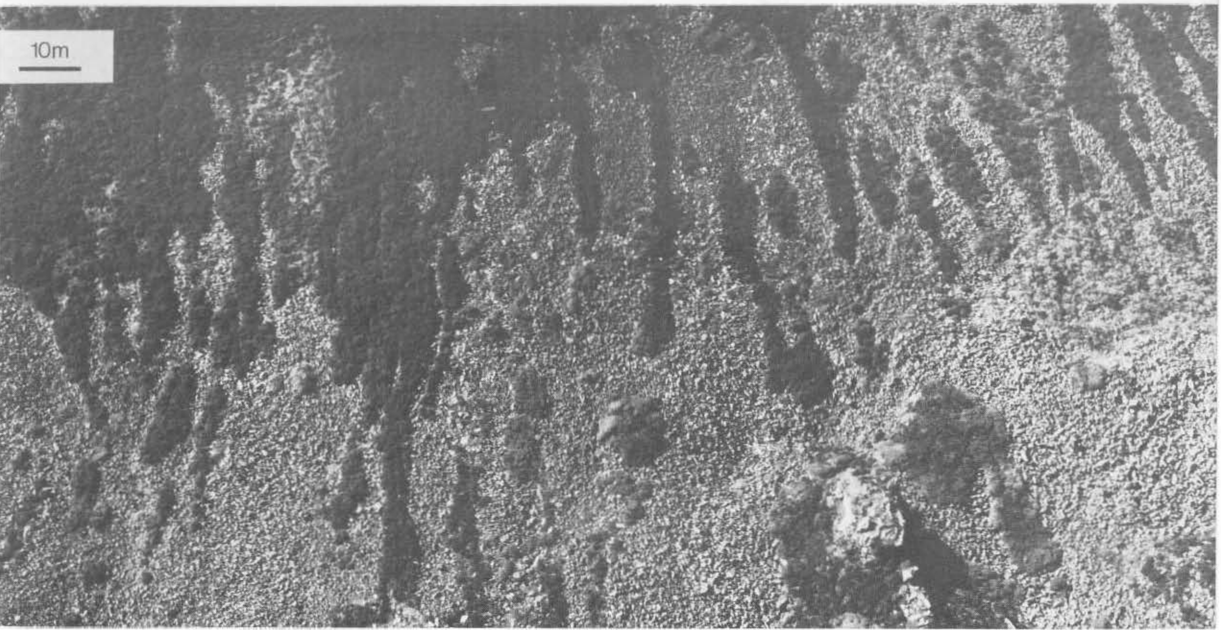
Page xiv (top)

(1950) N end of Stiperstones ridge, looking NE along W flank; Oak Hill in right foreground with Castle Ring on spur behind, then Crowsnest Dingle with scrub-oak (formerly coppiced) on S-facing slope of Resting Hill. White spoil-heaps of 'spar' (calcite and barytes), old mine buildings and chimney mark site of disused lead mine at Snailbeach; Maddox's Coppice on wooded hills beyond not yet replanted with conifers. Under cloud-shadow near top right The Hollies stand silhouetted against sunlit fields, above which Oaks Wood and Habberley Valley swing away to left behind Earl's Hill in top centre; distant expanse of North Shropshire Plain in background. Stiperstones is a National Nature Reserve, Earl's Hill a Trust Nature Reserve. [See Chapters 6, 7 and 8]. (FA 56)

Page xiv (bottom)

(1965) Llanymynech Hill (right foreground) and wooded limestone scarp of Blodwel Rock, looking NNE; Offa's Dyke runs along crest of W-facing cliff, with Blodwel Wood on steep scree slope to left partly felled and replanted. Open area with scattered birch and hawthorn at front right is a golf course, mainly in Powys, grazed by sheep and pitted with old copper mines; small meadows beyond include some with rich orchid flora; behind these (just beyond small wooded Crickheath Hill) stretches grazed, scrub-dotted common of Llynclys Hill, now a Trust Nature Reserve; in mid-right distance lie two more small Trust Reserves, Sweeney Fen and Dolgoch Quarry (disused). White scars at upper mid-left are Porth y Waen and Whitehaven quarries and lime works. Three other Trust Reserves lie just out of picture (Craig Sychtyn, Jones's Rough and Llanymynech Rocks). [See Chapters 6, 7 and 8]. (AKW 20)





10m

PART ONE
The Background

And the parched ground shall become a pool,
and the thirsty land springs of water:
in the habitation of dragons, where each lay,
shall be grass with reeds and rushes.

Isaiah 35:7

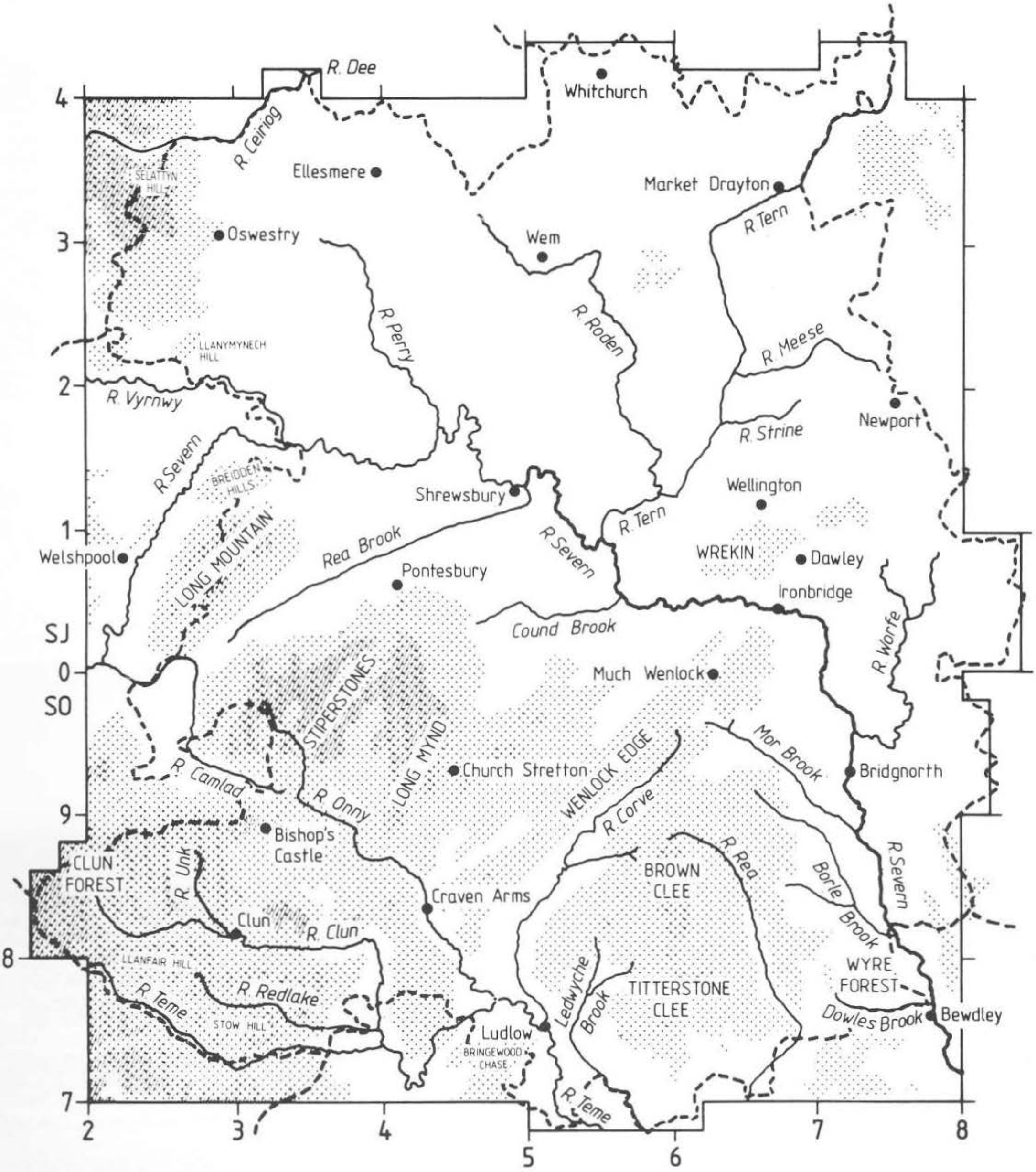


Figure 1.0
The main physical features of the Shropshire Region. The county outline is shown by a pecked line. Light shading indicates land over 500 feet (152m); heavily shaded areas are over 1000 feet (305m). The distribution of meres and disused canals is shown in Fig. 3.2f.

1 The survey 1970–83: organisation and methods

THE METHODS used in the early stages of the Shropshire Flora Project have already been described (Packham *et al* 1979). There were no fundamental changes in organisation during the remainder of the project so the description given below is a general one, with comments upon the fine detail of the later stages.

Shropshire is a very large county and it was realised from the beginning that any attempt to map its flora in a reasonable time would involve a large number of workers, particularly in view of the limited amount of field work which could be carried out by the editors. The distribution maps were originally intended to represent the time slice 1970–80; owing to a lack of records in certain areas this period was extended to 1983.

The previous history of botanical study in Shropshire (see Chapter 2), and the failure to produce a full-scale county Flora since that of the Revd William Leighton (1841), were in the minds of all those who attended the inaugural meeting of the Shropshire Flora Project on 22 January 1975. This meeting, held in the library of the Preston Montford Field Centre, discussed the methods proposed by the editors and made preliminary arrangements to cover the whole area.

The determination and enthusiasm of the initial meeting were keynotes throughout the entire project, and well over a hundred workers, organised in a federal system, contributed individual records. During the first season the general organisation was tested by making a roadside verge survey (Sinker, Packham and Trueman 1979) and by investigating the distribution of common (A) species throughout the region. From 1976 onwards records were made of rare (C) species and intermediate (B) species also.

The area covered

The majority of local Floras cover an administrative county or a Watsonian vice-county or a combination of these. Yet many counties are very irregular in shape, with intrusions from or extrusions into neighbouring ones. Shropshire is no exception, particularly on its western border with Montgomeryshire, v c 47 (now part of Powys). To restrict our Flora, and the maps illustrating it, to Shropshire alone would have missed interesting features of local plant distribution in relation to geology, relief and climate, especially on the Welsh border where changes occur over very short distances. This special feature of the region was one of the primary *raisons d'être* of the project. We therefore decided to record within a rectangle and, because the recording unit was to be the 10km square or the 2 × 2km subdivision of that square ('tetrad'), it seemed sensible to make the basic area a rectangle of 10km squares including almost the whole of present-day Shropshire and v c 40. The resulting block consists of 42 10km squares (six from west to east by seven from south to north). This and 50 additional tetrads around its margins, included to cover the rest of the county, comprise an area of $4400km^2$ or 1100 2 × 2km tetrads (see Fig. 10.1 on p. 166).

Collection and processing of records

The methods used to prepare the Flora differ in some respects from those employed previously, particularly in the use of the three frequency classes for recording purposes.

COMMON (A) SPECIES

From previous knowledge of the flora and from a study of the *Atlas of the British Flora* (Perring and Walters 1962), it appeared that there were about 200 species which would almost certainly occur in every 10km square in our region, the majority in nearly every tetrad. It might be argued that detailed maps showing the distribution of these widespread species could be valuable, but we believe that the task of handling the data involved (amounting to perhaps

Preston Montford Field Centre (Field Studies Council)

60% of the total number of records for less than 20% of the species in the flora) would unjustifiably restrict the time available for dealing effectively with the 80% or more of the species with limited and more interesting distributions.

Because this initial selection, however carefully made, might need revision, recorders were asked to note A species which they regarded as scarce in a 10km square ("seen in less than, say, five localities despite a careful search"). As a result, four species, *Allium ursinum*, *Equisetum fluviatile*, *E. palustre* and *Odontites verna*, were transferred to B species status at the end of the second full recording season.

Each species or aggregate on the A card (Fig. 1.1) was given a Latin name, one or more English names (precedence being given to those selected by Dony, Perring and Rob 1974) and a reference number, and recorders put a ring around the number of each species when it was encountered anywhere within the 10km square. If an A species was present but scarce, a cross was put beside the ringed reference number and grid references of localities in which it occurred were noted.

INTERMEDIATE (B) SPECIES

There proved to be over 400 species for which previous knowledge of distribution and ecology suggested that tetrad distribution maps could be most informative. At the same time it was agreed that records should, as far as possible, be so localised that, should some B species prove to be unexpectedly rare, it would be easy to relocate them. Thus the B species card (Fig. 1.2), besides carrying Latin and English names (frequently abbreviated) and a reference number for each species, had a cross beside each name, the quarters of which could be filled in, so that recorders could indicate in which of the 1km squares in any tetrad a species had been recorded without having to use a B card for each 1km square.

RARE (C) SPECIES

One of us (CAS) compiled a list of rare species and critical taxa, based on accumulated data, intended to indicate all those species recorded from three or fewer 10km squares in Shropshire. It was agreed that, for conservation purposes and for future reviews of their status, records of these taxa had to be localised, though not necessarily published. Records of any of them and of any newly discovered taxon were transferred to a 'grid square' recording card, divided by bold lines into 25 tetrads, each of which bore a letter. Every card was also divided by pecked lines into 100 1km squares, each of which bore a two-figure number (Fig. 1.3); one such card was used for all records of a C species within a particular 10km square. The number of each 1km square in which the species was seen was ringed and, in addition, a 100m 8-figure map reference and habitat record noted for each occurrence in a space at the bottom of the card or on the back.

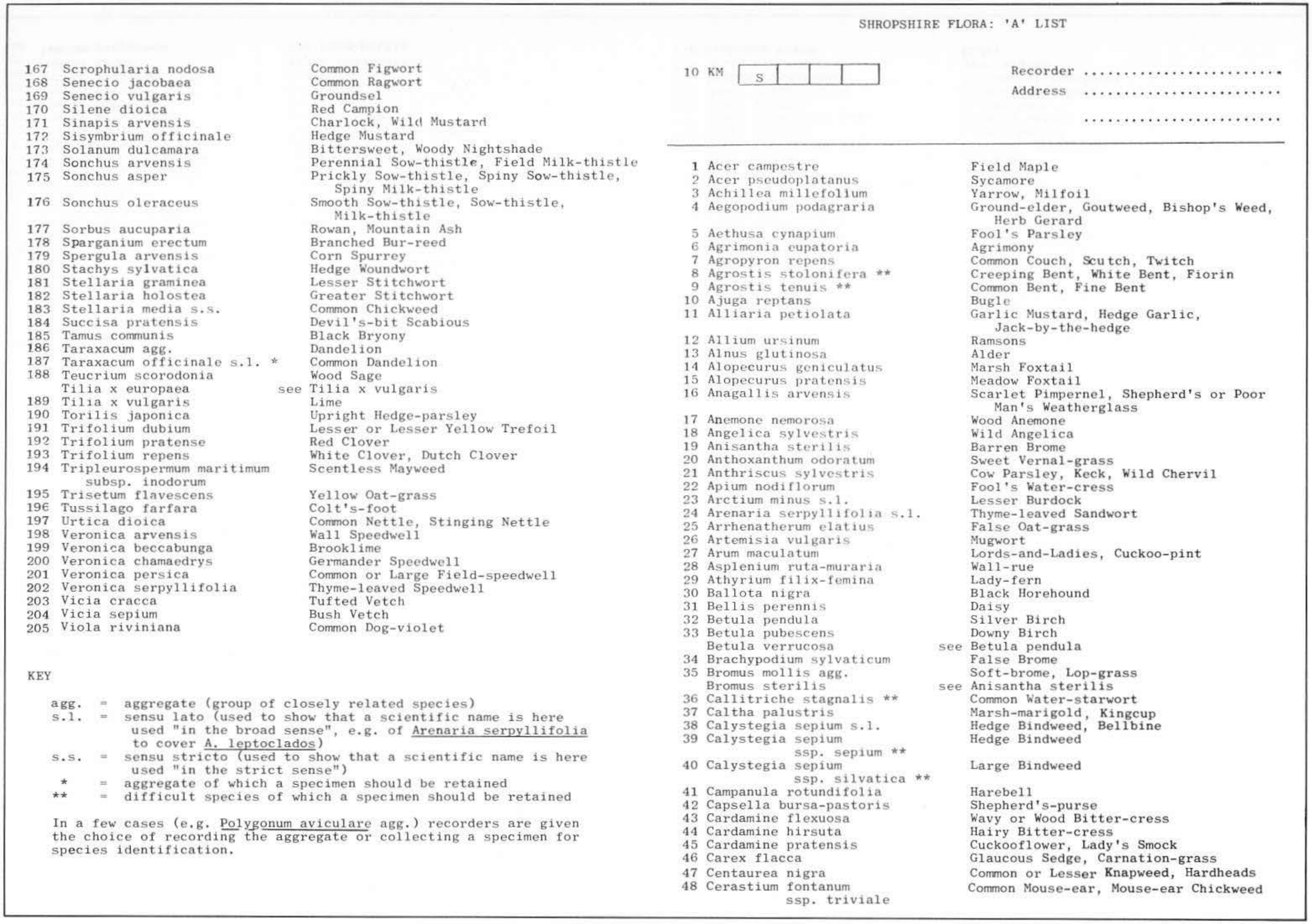
Recorders and their organisation

As previously mentioned the scheme had a federal structure; one person was appointed to act as co-ordinator to collate the records of each 10km square. The instructions for general recording, *Recording of the Shropshire Flora*, were perfected during the first year of operation and issued at the first Annual General Meeting of the Flora Project on 23 January 1976.

The annual meetings were an important feature of the Flora Project. They undoubtedly gave the recorders, whose names are shown at the end of this chapter, a feeling of belonging to a viable organisation, an opportunity to review progress and ask questions about methods, and a strong social base which is essential to friendly co-operation in a shared venture. By the time of the third annual meeting in March 1978, for example, it was possible to demonstrate the value of the B and C species recording and the rapid progress which had been made in the preparation of maps during the previous twelve months.

Courses held by FHP at Attingham Park before the Flora Project was launched helped to train a nucleus of workers. Records were made from many parts of Shropshire and a Flora of Attingham Park was published privately. Other week and weekend courses, run at Preston Montford Field Centre (FHP), also assisted skills and made contributions to the field records. In addition, a number of two-hour 'surgeries' were held in Shrewsbury to determine 'difficult' plants brought in for identification. Evening classes in Shrewsbury and Bridgnorth on plant classification, identification, distribution and ecology (CAS, JRP, ICT) helped to increase further the efficiency of the recorders. This raises the point that a scheme using a large number of workers, while having its difficulties, performs the useful function of increasing the number and quality of the local botanists.

The invention of a 'minimap' card (Fig. 1.4) enabled co-ordinators to build up a full set of tetrad maps for B species in their 10km squares, rather than relying on a computer assembly of county species maps from the B cards. This involved the recorders more directly in the preparation of the results, thus helping to maintain their interest. The number above each minimap corresponded to the species number on the B card. An entry for species 40, *Calluna vulgaris*, in grid-square S068 is shown in Fig. 1.4, whilst the complete map for this species is shown in Fig. 3.1. Minimap cards were sent to Miss H Davidson and Miss M J Lee each winter and they, with additional help, assembled complete maps for all B species. Miss Davidson also undertook the arduous task of preparing most of the plant distribution maps for printing. Records of the A species were sent direct to the executive editor (JRP), while the much more taxing task of assembling and checking the C records was undertaken by Dr Diana Kingham, who came to the county in 1978 in order to set up a Biological Records Centre for the Shropshire County Museum Service at Ludlow and later continued



SHROPSHIRE FLORA: 'A' LIST

10 KM S

Recorder ....

Address ....

....

1	Acer campestre	Field Maple
2	Acer pseudoplatanus	Sycamore
3	Achillea millefolium	Yarrow, Milfoil
4	Aegopodium podagraria	Ground-elder, Goutweed, Bishop's Weed, Herb Gerard
5	Aethusa cynapium	Fool's Parsley
6	Agrimonia eupatoria	Agrimony
7	Agropyron repens	Common Couch, Scutch, Twitch
8	Agrostis stolonifera **	Creeping Bent, White Bent, Fiorin
9	Agrostis tenuis **	Common Bent, Fine Bent
10	Ajuga reptans	Bugle
11	Alliaria petiolata	Garlic Mustard, Hedge Garlic, Jack-by-the-hedge
12	Allium ursinum	Ramsons
13	Alnus glutinosa	Alder
14	Alopecurus geniculatus	Marsh Foxtail
15	Alopecurus pratensis	Meadow Foxtail
16	Anagallis arvensis	Scarlet Pimpernel, Shepherd's or Poor Man's Weatherglass
17	Anemone nemorosa	Wood Anemone
18	Angelica sylvestris	Wild Angelica
19	Anisantha sterilis	Barren Brome
20	Anthoxanthum odoratum	Sweet Vernal-grass
21	Anthriscus sylvestris	Cow Parsley, Keck, Wild Chervil
22	Apium nodiflorum	Fool's Water-cress
23	Arctium minus s.l.	Lesser Burdock
24	Arenaria serpyllifolia s.l.	Thyme-leaved Sandwort
25	Arrhenatherum elatius	False Oat-grass
26	Artemisia vulgaris	Mugwort
27	Arum maculatum	Lords-and-Ladies, Cuckoo-pint
28	Asplenium ruta-muraria	Wall-rue
29	Athyrium filix-femina	Lady-fern
30	Ballota nigra	Black Horehound
31	Bellis perennis	Daisy
32	Betula pendula	Silver Birch
33	Betula pubescens	Downy Birch
	Betula verrucosa	see Betula pendula
34	Brachypodium sylvaticum	False Brome
35	Bromus mollis agg.	Soft-brome, Lop-grass
	Bromus sterilis	see Anisantha sterilis
36	Callitriche stagnalis **	Common Water-starwort
37	Caltha palustris	Marsh-marigold, Kingcup
38	Calystegia sepium s.l.	Hedge Bindweed, Bellbine
39	Calystegia sepium ssp. sepium **	Hedge Bindweed
40	Calystegia sepium ssp. silvatica **	Large Bindweed
41	Campanula rotundifolia	Harebell
42	Capsella bursa-pastoris	Shepherd's-purse
43	Cardamine flexuosa	Wavy or Wood Bitter-cress
44	Cardamine hirsuta	Hairy Bitter-cress
45	Cardamine pratensis	Cuckooflower, Lady's Smock
46	Carex flacca	Glaucous Sedge, Carnation-grass
47	Centaurea nigra	Common or Lesser Knapweed, Hardheads
48	Cerastium fontanum ssp. triviale	Common Mouse-ear, Mouse-ear Chickweed

167	Scrophularia nodosa	Common Figwort
168	Senecio jacobaea	Common Ragwort
169	Senecio vulgaris	Groundsel
170	Silene dioica	Red Campion
171	Sinapis arvensis	Charlock, Wild Mustard
172	Sisymbrium officinale	Hedge Mustard
173	Solanum dulcamara	Bittersweet, Woody Nightshade
174	Sonchus arvensis	Perennial Sow-thistle, Field Milk-thistle
175	Sonchus asper	Prickly Sow-thistle, Spiny Sow-thistle, Spiny Milk-thistle
176	Sonchus oleraceus	Smooth Sow-thistle, Sow-thistle, Milk-thistle
177	Sorbus aucuparia	Rowan, Mountain Ash
178	Sparganium erectum	Branched Bur-reed
179	Spergula arvensis	Corn Spurrey
180	Stachys sylvatica	Hedge Woundwort
181	Stellaria graminea	Lesser Stitchwort
182	Stellaria holostea	Greater Stitchwort
183	Stellaria media s.s.	Common Chickweed
184	Succisa pratensis	Devil's-bit Scabious
185	Tamus communis	Black Bryony
186	Taraxacum agg.	Dandelion
187	Taraxacum officinale s.l. *	Common Dandelion
188	Teucrium scorodonia	Wood Sage
	Tilia x europaea	see Tilia x vulgaris
189	Tilia x vulgaris	Lime
190	Torilis japonica	Upright Hedge-parsley
191	Trifolium dubium	Lesser or Lesser Yellow Trefoil
192	Trifolium pratense	Red Clover
193	Trifolium repens	White Clover, Dutch Clover
194	Tripleurospermum maritimum subsp. inodorum	Scentless Mayweed
195	Trisetum flavescens	Yellow Oat-grass
196	Tussilago farfara	Colt's-foot
197	Urtica dioica	Common Nettle, Stinging Nettle
198	Veronica arvensis	Wall Speedwell
199	Veronica beccabunga	Brooklime
200	Veronica chamaedrys	Germander Speedwell
201	Veronica persica	Common or Large Field-speedwell
202	Veronica serpyllifolia	Thyme-leaved Speedwell
203	Vicia cracca	Tufted Vetch
204	Vicia sepium	Bush Vetch
205	Viola riviniana	Common Dog-violet

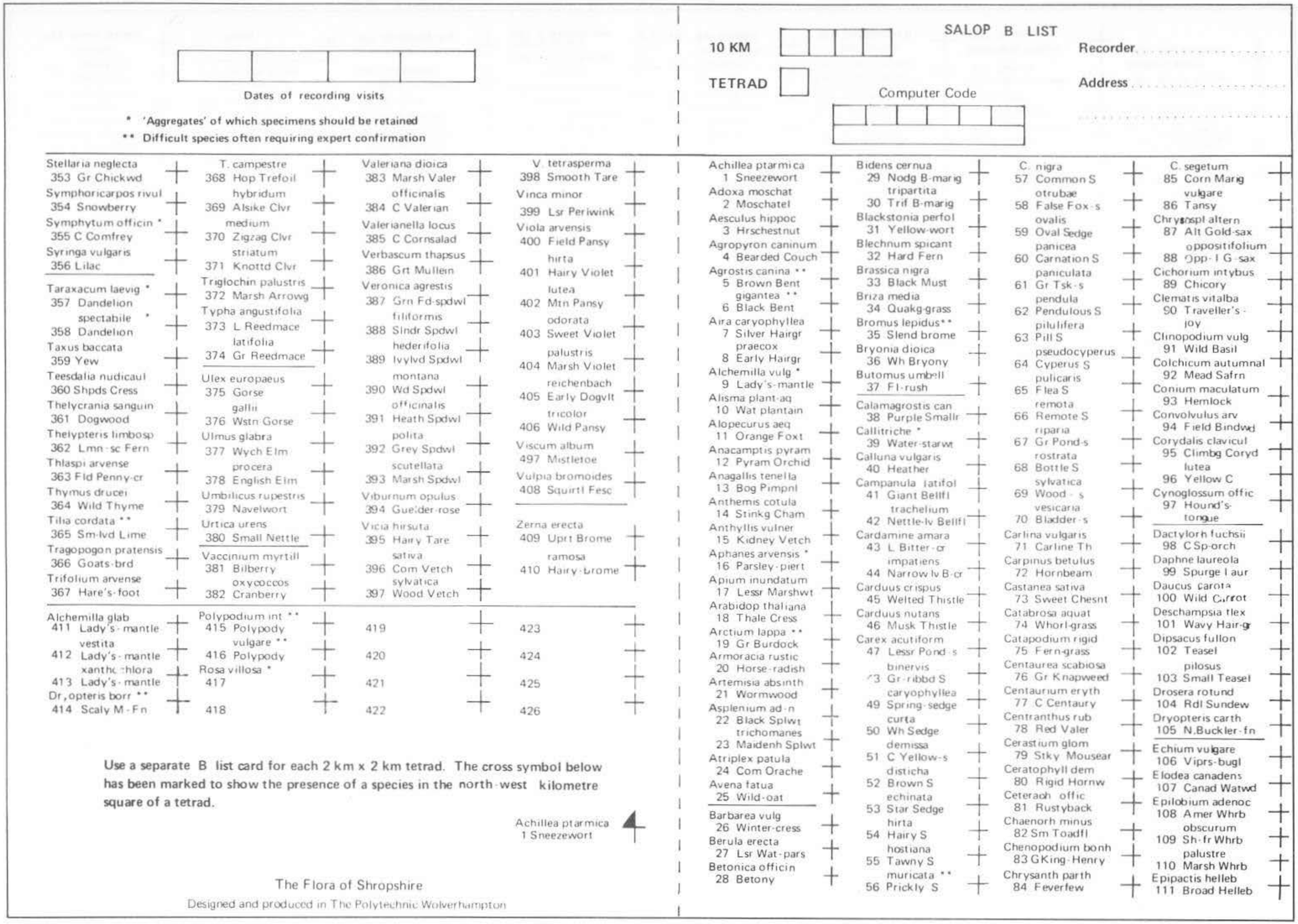
KEY

agg. = aggregate (group of closely related species)
s.l. = sensu lato (used to show that a scientific name is here used "in the broad sense", e.g. of Arenaria serpyllifolia to cover A. leptoclados)
s.s. = sensu stricto (used to show that a scientific name is here used "in the strict sense")
* = aggregate of which a specimen should be retained
** = difficult species of which a specimen should be retained

In a few cases (e.g. Polygonum aviculare agg.) recorders are given the choice of recording the aggregate or collecting a specimen for species identification.

Figure 1.1 *Front, back and inside of folded A4 card listing some 200 common (A) species or aggregates.*

	Cerastium holosteoides	see	C. fontanum ssp. triviale
	Cerastium vulgatum	see	C. fontanum ssp. triviale
49	Chaerophyllum temulentum		Rough Chervil
	Chamaenerion angustifolium	see	Epilobium angustifolium
50	Chelidonium majus		Greater Celandine
51	Chenopodium album		Fat-hen
52	Chrysanthemum leucanthemum		Oxeye Daisy, Marguerite
53	Circaea lutetiana		Enchanter's-nightshade
54	Cirsium arvense		Creeping Thistle
55	Cirsium palustre		Marsh Thistle
56	Cirsium vulgare		Spear Thistle
57	Conopodium majus		Pignut, Earthnut
58	Corylus avellana		Hazel, Cob-nut
59	Crataegus monogyna		Hawthorn
60	Crepis capillaris		Smooth Hawk's-beard
61	Cymbalaria muralis		Ivy-leaved Toadflax
62	Cynosurus cristatus		Crested Dog's-tail
63	Dactylis glomerata		Cock's-foot
64	Deschampsia cespitosa		Tufted Hair-grass
65	Digitalis purpurea		Foxglove
	Dryopteris austriaca	see	Dryopteris dilatata
66	Dryopteris dilatata		Broad Buckler-fern
67	Dryopteris filix-mas agg.		Male-fern
68	Dryopteris filix-mas **		Male-fern
69	Eleocharis palustris		Common Spike-rush
70	Endymion non-scriptus		Bluebell
71	Epilobium angustifolium		Rosebay Willowherb, Rose-bay, Fireweed
72	Epilobium hirsutum		Great or Great Hairy Willowherb
73	Epilobium montanum		Broad-leaved Willowherb
74	Epilobium parviflorum		Hoary or Lesser Hairy Willowherb
75	Equisetum arvense		Field Horsetail, Common Horsetail
76	Equisetum fluviatile		Water Horsetail
77	Equisetum palustre		Marsh Horsetail
78	Euphorbia helioscopia		Sun Spurge
79	Euphorbia peplus		Petty Spurge
80	Festuca ovina agg.		Sheep's-fescue
81	Festuca rubra agg.		Red Fescue
82	Filipendula ulmaria		Meadowsweet
83	Fragaria vesca		Wild Strawberry
84	Fraxinus excelsior		Ash
85	Galeopsis tetrahit s.l.		Common Hemp-nettle
86	Galium aparine		Cleavers, Goosegrass
87	Galium palustre		Common Marsh-bedstraw
88	Galium verum		Lady's Bedstraw
89	Geranium dissectum		Cut-leaved Crane's-bill
90	Geranium molle		Dove's-foot Crane's-bill
91	Geranium robertianum		Herb-Robert
92	Geum urbanum		Wood Avens, Herb Bennet
93	Glechoma hederacea		Ground-ivy
94	Hedera helix		Ivy
95	Heracleum sphondylium		Hogweed, Cow Parsnip
96	Hieracium pilosella		Mouse-ear Hawkweed
97	Holcus lanatus		Yorkshire-fog
98	Holcus mollis		Creeping Soft-grass
99	Hypericum perforatum		Perforate or Common St. John's-wort
100	Hypericum tetrapterum		Square-stalked St. John's-wort
101	Hypochoeris radicata		Cat's-ear
102	Iris pseudacorus		Yellow Iris, Yellow Flag
103	Juncus articulatus		Jointed Rush
104	Juncus bufonius		Toad Rush
105	Juncus effusus		Soft Rush
106	Juncus inflexus		Hard Rush
107	Lamium album		White Dead-nettle
108	Lamium purpureum		Red Dead-nettle
109	Lapsana communis		Nipplewort
110	Lathyrus pratensis		Meadow Vetchling
111	Lemna minor		Common Duckweed
112	Leontodon autumnalis		Autumn Hawkbit
	Leucanthemum vulgare	see	Chrysanthemum leucanthemum
113	Lolium perenne		Perennial Rye-grass
114	Lonicera periclymenum		Honeysuckle
115	Lotus corniculatus		Common Bird's-foot-trefoil, Eggs-and-bacon
116	Lotus uliginosus		Greater or Large Bird's-foot-trefoil
117	Luzula campestris		Field Wood-rush
118	Lychnis flos-cuculi		Ragged-Robin
119	Lysimachia nemorum		Yellow Pimpernel
120	Malva sylvestris		Common Mallow
	Matricaria maritima	see	Tripleurospermum maritimum
121	Matricaria matricarioides		Pineappleweed, Rayless Mayweed
122	Medicago lupulina		Black Medick
	Melandrium rubrum	see	Silene dioica
123	Mentha aquatica		Water Mint
124	Mercurialis perennis		Dog's Mercury
125	Moehringia trinervia		Three-nerved Sandwort
126	Myosotis arvensis		Field or Common Forget-me-not
	Myosotis palustris ssp. palustris	see	Myosotis scorpioides
127	Myosotis scorpioides **		Water Forget-me-not
	Nasturtium officinale	see	Rorippa nasturtium-aquaticum
128	Odontites verna		Red Bartsia
129	Oxalis acetosella		Wood-sorrel
130	Papaver rhoeas		Common Poppy, Field Poppy
131	Phalaris arundinacea		Reed Canary-grass
132	Phleum pratense		Timothy
133	Plantago lanceolata		Ribwort Plantain
134	Plantago major		Greater or Rat-tail Plantain
135	Poa annua		Annual Meadow-grass
136	Poa pratensis		Smooth Meadow-grass
137	Poa trivialis		Rough Meadow-grass
138	Polygonum aviculare agg.		Knotgrass
139	Polygonum arenastrum**		Knotgrass
140	Polygonum aviculare **		Knotgrass
141	Polygonum persicaria		Redshank, Redleg, Persicaria
142	Potentilla anserina		Silverweed
143	Potentilla erecta		Tormentil
144	Potentilla reptans		Creeping Cinquefoil
145	Potentilla sterilis		Barren Strawberry
146	Primula vulgaris		Primrose
147	Prunella vulgaris		Selfheal
148	Prunus spinosa		Blackthorn, Sloe
149	Pteridium aquilinum		Bracken
150	Quercus robur		Pedunculate Oak, Common Oak
151	Ranunculus acris		Meadow Buttercup
152	Ranunculus bulbosus		Bulbous Buttercup
153	Ranunculus ficaria		Lesser Celandine
154	Ranunculus flammula		Lesser Spearwort
155	Ranunculus repens		Creeping Buttercup
156	Rorippa nasturtium-aquaticum*		Water-cress
157	Rosa arvensis		Field Rose
158	Rosa canina*		Dog Rose
159	Rubus fruticosus agg.		Bramble, Blackberry
160	Rumex acetosa		Common Sorrel
161	Rumex acetosella agg.		Sheep's Sorrel
162	Rumex crispus		Curled Dock
163	Rumex obtusifolius		Broad-leaved Dock
164	Sagina procumbens		Procumbent Pearlwort
165	Salix cinerea s.l.		Grey Willow
166	Sambucus nigra		Elder



Dates of recording visits

* 'Aggregates' of which specimens should be retained
** Difficult species often requiring expert confirmation

Stellaria neglecta
353 Gr Chickwd
Symphoricarpos rivul
354 Snowberry
Symphytum officin *
355 C Comfrey
Syringa vulgaris
356 Lilac
Taraxacum laevig *
357 Dandelion
spectabile *
358 Dandelion
Taxus baccata
359 Yew
Teesdalia nudicaul
360 Shpds Cress
Thelycrania sanguin
361 Dogwood
Thelypteris limbosp
362 Lmn-sc Fern
Thlaspi arvense
363 Fld Penny-cr
Thymus drucei
364 Wild Thyme
Tilia cordata **
365 Sm-lvd Lime
Tragopogon pratensis
366 Goats-brd
Trifolium arvense
367 Hare's-foot

T. campestre
368 Hop Trefoil
hybridum
369 Alsike Clvr
medium
370 Zigzag Clvr
striatum
371 Knottd Clvr
Triglochin palustris
372 Marsh Arrowg
Typha angustifolia
373 L Reedmace
latifolia
374 Gr Reedmace
Ulex europaeus
375 Gorse
gallii
376 Wstn Gorse
Ulmus glabra
377 Wych Elm
procera
378 English Elm
Umbilicus rupestris
379 Navelwort
Urtica urens
380 Small Nettle
Vaccinium myrtill
381 Bilberry
oxycoccos
382 Cranberry

Valeriana dioica
383 Marsh Valer
officinalis
384 C Valerian
Valerianella locus
385 C Cornsalad
Verbascum thapsus
386 Grt Mullein
Veronica agrestis
387 Grn Fd-spdwl
filiformis
388 Slndr Spdwl
hederifolia
389 Ivylvd Spdwl
montana
390 Wd Spdwl
officinalis
391 Heath Spdwl
polita
392 Grey Spdwl
scutellata
393 Marsh Spdwl
Viburnum opulus
394 Guelder-rose
Vicia hirsuta
395 Hairy Tare
sativa
396 Com Vetch
sylvatica
397 Wood Vetch

V. tetrasperma
398 Smooth Tare
Vinca minor
399 Lsr Periwink
Viola arvensis
400 Field Pansy
hirta
401 Hairy Violet
lutea
402 Mtn Pansy
odorata
403 Sweet Violet
palustris
404 Marsh Violet
reichenbach
405 Early Dogvlt
tricolor
406 Wild Pansy
Viscum album
497 Mistletoe
Vulpia bromoides
408 Squirtl Fesc
Zerna erecta
409 Uprt Brome
ramosa
410 Hairy-brome

Alchemilla glab
411 Lady's-mantle
vestita
412 Lady's-mantle
xanthochlora
413 Lady's-mantle
Dryopteris borr **
414 Scaly M-Fn

Polypodium int **
415 Polypody
vulgare **
416 Polypody
Rosa villosa *
417
418

419
420
421
422

423
424
425
426

Use a separate B list card for each 2 km x 2 km tetrad. The cross symbol below has been marked to show the presence of a species in the north-west kilometre square of a tetrad.

Achillea ptarmica
1 Sneezewort

The Flora of Shropshire

Designed and produced in The Polytechnic Wolverhampton

10 KM

TETRAD

SALOP B LIST

Computer Code

Recorder ....

Address ....

Achillea ptarmica
1 Sneezewort
Adoxa moschat
2 Moschatel
Aesculus hippoc
3 Hrschestnut
Agropyron caninum
4 Bearded Couch
Agrostis canina **
5 Brown Bent
gigantea **
6 Black Bent
Aira caryophyllea
7 Silver Hairgr
praecox
8 Early Hairgr
Alchemilla vulg *
9 Lady's-mantle
Alisma plant-aq
10 Wat plantain
Alopecurus aeq
11 Orange Foxt
Anacamptis pyram
12 Pyram Orchid
Anagallis tenella
13 Bog Pimpnl
Anthemis cotula
14 Stinkg Cham
Anthyllis vulner
15 Kidney Vetch
Aphanes arvensis *
16 Parsley-piert
Apium inundatum
17 Lessr Marshwt
Arabidop thaliana
18 Thale Cress
Arctium lappa **
19 Gr Burdock
Armoracia rustic
20 Horse-radish
Artemisia absinth
21 Wormwood
Asplenium ad-n
22 Black Splwt
trichomanes
23 Maidenh Splwt
Atriplex patula
24 Com Orache
Avena fatua
25 Wild-oat
Barbarea vulg
26 Winter-cress
Berula erecta
27 Lsr Wat-pars
Betonica officin
28 Betony

Bidens cernua
29 Nodg B-marig
tripartita
30 Trif B-marig
Blackstonia perfol
31 Yellow-wort
Blechnum spicant
32 Hard Fern
Brassica nigra
33 Black Must
Briza media
34 Quakg-grass
Bromus lepidus**
35 Slend brome
Bryonia dioica
36 Wh Bryony
Butomus umbell
37 Fl-rush
Calamagrostis can
38 Purple Smallr
Callitriche *
39 Water-starwt
Calluna vulgaris
40 Heather
Campanula latifol
41 Giant Bellfl
trachelium
42 Nettle-lv Bellfl
Cardamine amara
43 L Bitter-cr
impatiens
44 Narrow lv B-cr
Carduus crispus
45 Welted Thistle
Carduus nutans
46 Musk Thistle
Carex acutiform
47 Lessr Pond-s
binervis
48 Gr-ribbd S
caryophyllea
49 Spring-sedge
curta
50 Wh Sedge
demissa
51 C Yellow-s
disticha
52 Brown S
echinata
53 Star Sedge
hirta
54 Hairy S
hostiana
55 Tawny S
muricata **
56 Prickly S

C. nigra
57 Common S
otrubae
58 False Fox-s
ovalis
59 Oval Sedge
panicea
60 Carnation S
paniculata
61 Gr Tsk-s
pendula
62 Pendulous S
pilulifera
63 Pill S
pseudocyperus
64 Cyperus S
pulicaris
65 Flea S
remota
66 Remote S
riparia
67 Gr Pond-s
rostrata
68 Bottle S
sylvatica
69 Wood-s
vesicaria
70 Bladder-s
Carlina vulgaris
71 Carline Th
Carpinus betulus
72 Hornbeam
Castanea sativa
73 Sweet Chesnt
Catabrosa aquat
74 Whorl-grass
Catapodium rigid
75 Fern-grass
Centaurea scabiosa
76 Gr Knapweed
Centaurium eryth
77 C Centaury
Centranthus rub
78 Red Valer
Cerastium glom
79 Stky Mousear
Ceratophyll dem
80 Rigid Hornw
Ceterach offic
81 Rustyback
Chaenorh minus
82 Sm Toadfl
Chenopodium bonh
83 GKing-Henry
Chrysanth parth
84 Feverfew

C. segetum
85 Corn Marig
vulgare
86 Tansy
Chrysospl altern
87 Alt Gold-sax
oppositifolium
88 Opp-l G-sax
Cichorium intybus
89 Chicory
Clematis vitalba
90 Traveller's-joy
Clinopodium vulg
91 Wild Basil
Colchicum autumnal
92 Mead Safrn
Conium maculatum
93 Hemlock
Convolvulus arv
94 Field Bindwd
Corydalis clavicul
95 Climbg Coryd
lutea
96 Yellow C
Cynoglossum offic
97 Hound's-tongue
Dactylorh fuchsii
98 C Sp-orch
Daphne laureola
99 Spurge l aur
Daucus carota
100 Wild Carrot
Deschampsia flex
101 Wavy Hair-gr
Dipsacus fullon
102 Teasel
pilosus
103 Small Teasel
Drosera rotund
104 Rdl Sundew
Dryopteris carth
105 N.Buckler-fn
Echium vulgare
106 Viprs-bugl
Elodea canadens
107 Canad Watwd
Epilobium adenoc
108 Amer Whrb
obscurum
109 Sh-fr Whrb
palustre
110 Marsh Whrb
Epipactis helleb
111 Broad Helleb

Figure 1.2 *Front, back and inside of a B species card showing the data required and the method of recording. Note that records were made on a 1 km square basis although the Flora maps show records for tetrads only.*

Equisetum sylvatic
112 Wood Hrstl
telmateia
113 Gr Horsetl
Erica cinerea
114 Bell Heather
tetralix
115 Crslvd Heath
Erigeron acer
116 Blue Flbane
Eriophorum angustif
117 C Cottongr
vaginatum
118 Hare's-tail C
Erodium cicutar
119 C Storksbill
Erophila verna
120 C Whitlowgr
Erysimum cheiran
121 Treacle Must
Euonymus europ
123 Spindle
Eupatorium cannab
124 Hemp-agrim
Euphorbia amygdal
125 Wood Spurge
exigua
126 Dwarf Sp
Euphrasia *
127 Eyebright

Fagus sylvatica
128 Beech
Festuca arundinac
129 Tall Fescue
gigantea
130 Giant Fesc
pratensis
131 Meadow Fesc
Filago minima
132 Sm Cudweed
vulgaris
133 C Cudweed
Frangula alnus
134 Alder Buckth
Fumaria muralis **
135 C Ramp Fum
officinalis *
136 C Fumitory

Galanthus nivalis
137 Snowdrop
Galeopsis speciosa
138 L-fl Hemp-n
Galium cruciata
139 Crosswort
mollugo
140 Hdg Bdstrw
odoratum
141 Woodruff
saxatile
142 Heath Bedstr

G. uliginosum
143 Fen Bedstr
Genista tinctoria
144 Dyers Greenwd
Gentianella amarel
145 Autumn Gentn
Geranium columbin
146 L-st Cranesbill
lucidum
147 Shining Crnsbl
pratense
148 Meadow Crnsbl
pusillum
149 Small-fl Crnsbl
pyrenaicum
150 Hdgrow Crnsbl
Geum rivale
151 Water Avens
Glyceria declin **
152 Sm Swt-gr
fluitans **
153 Float Swt gr
maxima
154 Reed Swt-gr
plicata **
155 Plicate Swt-gr
Gnaphalium uligin
156 Marsh Cudwd
Gymnadenia conop
157 Fragr Orchd
Gymnocarpium dryopt
158 Oak Fern

Helianthemum cham
159 C Rockrose
Helictotrich pubesc
160 Downy Oat-g
Hesperis matronalis
161 Dames-violt
Hordeum murinum
162 Wall Barley
Hottonia palustris
163 Water-violt
Humulus lupulus
164 Hop
Hydrocotyle vulgaris
165 Marsh Pennywt
Hypericum andros
166 Tutsan
calycinum
167 Rose Sharon
hirsutum
168 Hairy St Jwt
humifusum
169 Trailg St Jwt
maculatum
170 Imp St Jwt
pulchrum
171 Slender St Jwt

Ilex aquifolium
172 Holly

Impatiens glandul
173 Ind Balsam
Inula conyza
174 Ploughm-sp
Isolepis setacea
175 Bristle Cl-rush

Jasione montana
176 Sheeps-bit
Juncus acutiflorus
177 Sharp-fl Rush
bulbosus
178 Bulbous R
squarrosus
179 Heath R
subuliflorus
180 Compact R

Knautia arvensis
181 Fld Scabious

Lamium galeobdolon
182 Ylw Archangel
Lamium amplexic
183 Henbit D-ntl
Lathraea squamaria
184 Toothwort
Lathyrus montanus
185 Bitter Vetch
Lemna trisulca
186 Ivy-l Duckw
Leontodon hispidus
187 RghHawkbt
taraxacoides
188 Lessr Hawkbt
Lepidium heteroph
189 Smiths Peprwt
Ligustrum vulg
190 Wld Privet
Linaria vulgaris
191 C Toadflax
Linum catharticum
192 Fairy Flax
Listera ovata
193 C Twayblade
Lolium multifl
194 Ital Rye-gr
Luzula multifl
195 Heath Wdrsh
pilosa
196 Hairy Wdrsh
sylvatica
197 Great Wdrush
Lycium barbarum
198 Duke Argll T
Lycopsis arvensis
199 Bugloss
Lycopus europaeus
200 Gipsywort
Lysimachia nummul
201 Creeping-Jny

L. vulgaris
202 Y Loosestrf
Lythrum salicaria
203 P-loosestrf

Malus sylvestris
204 Crab Apple
Malva moschata
205 Musk Mallow
neglecta
206 Dwarf Mallow
Matricaria recutita
207 Scented Maywd
Meconopsis cambrica
208 Welsh Poppy
Melampyrum pratense
209 C Cow-wheat
Melica uniflora
210 Wd Melick
Mentha arvensis **
211 Corn Mint
Menyanthes trifol
212 Bogbean
Milium effusum
213 Wd Millet
Mimulus guttatus
214 Monkeyflower
Molinia caerulea
215 P Moor-grass
Montia fontana *
216 Blinks
Mycelis muralis
217 Wall Ltce
Myosotis caespitosa **
218 Tuftd F-m-n
discolor
219 Changing F-m-n
secunda **
220 Creepg F-m-n
Myosoton aquaticum
221 Wat Chickwd
Myriophyllum spicat
222 Spkd W-milfl

Narcissus pseudonar
223 Wld Daffodil
Nardus stricta
224 Mat-grass
Narthecium ossifrag
225 Bog Asphodel
Nuphar lutea
226 Yel W-lily
Nymphaea alba
227 Wh W-lily

Oenanthe aquatica
228 F-lvd W-dropwt
crocata
229 Hem W-dropwt
fistulosa
230 Tub W-dropwt
Ononis repens
231 C Restharrow
Ophrys apifera
232 Bee Orchid
Orchis mascula
233 E-purple Orc
morio
234 Green-w Orc
Origanum vulgare
235 Marjoram
Ornithopus perpus
236 Birdsfoot
Oxalis corniculata
237 Proc Y Sorrel

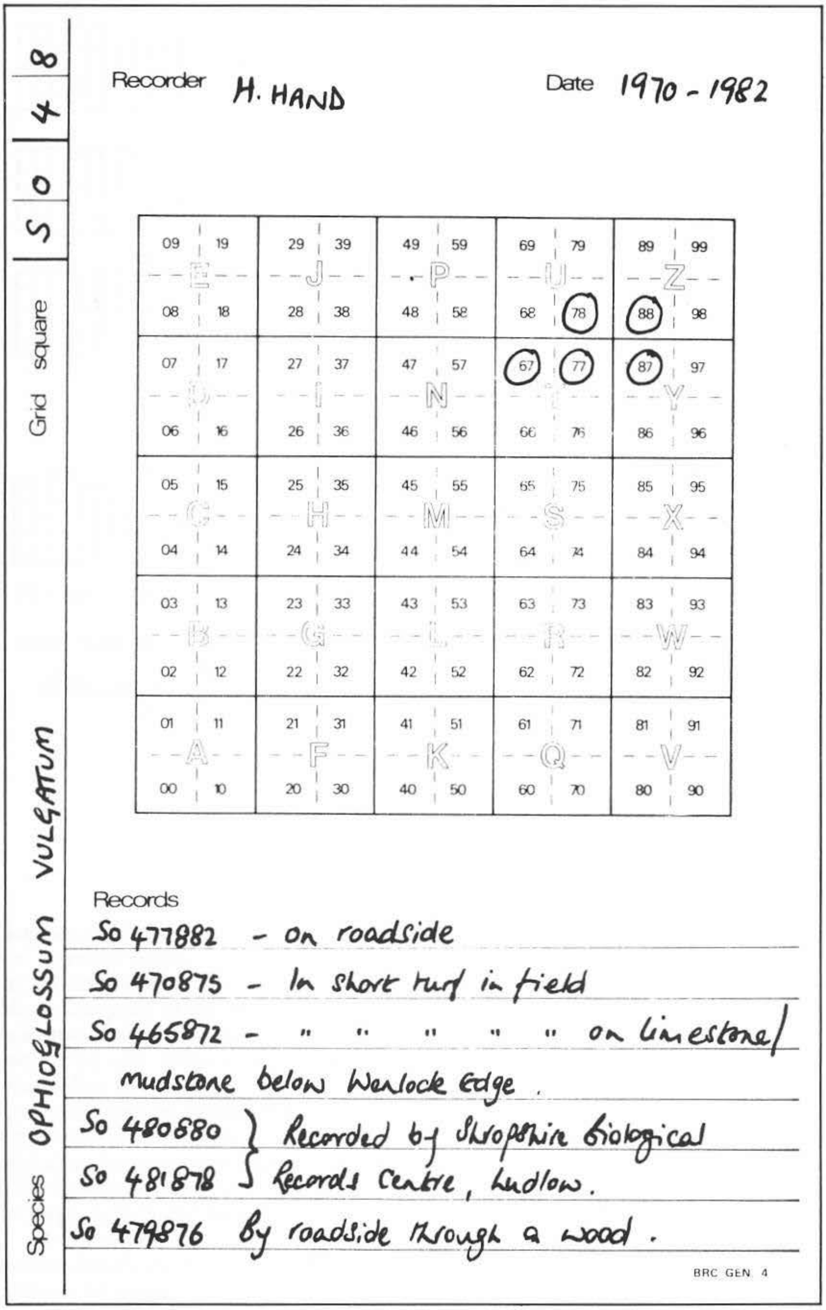
Papaver argemone
238 Prickly Poppy
dubium
239 Lg-hd Poppy
Parietaria diffusa
240 Pell-o-wall
Paris quadrifolia
241 Herb-Paris
Pedicularis palustris
242 Mrsh Lousewt
sylvatica
243 Lousewort
Pentaglottis semp
244 Grn Alkanet
Peplis portula
245 W-purslane
Petasites hybridus
246 Butterbur
Phragmites commun
247 Common Reed
Phyllitis scolopendr
248 Harts-tongue
Picris hieracioid
249 Hawkw Oxtng
Pimpinella saxif
250 Burnet-sax
Pinus sylvestris
251 Scots Pine
Plantago media
252 Hoary Plantn
Platanthera bifol
253 L Butrfl Orc
chlorantha
254 G Butrfl Orc
Poa compressa
255 Flat Meadw-gr
nemoralis
256 Wd Meadw-gr
Polygala serp
257 Heath Milkwt
vulgaris
258 C Milkwt
Polygonum amph
259 Amph Bistort
bistorta
260 C Bistort
convolvulus
261 Blk-bindwd

P. cuspidatum
262 Jap Knotwd
hydropiper
263 Wat-pepper
lapathifolium
264 Pale Persicaria
Polystichum aculeat
265 Hrd Shieldf
setiferum
266 Soft Shieldf
Populus alba
267 Wh Poplar
Populus canescens
268 Grey Poplar
nigra **
269 Black Poplar
tremula
270 Aspen
Potamogeton alp **
271 Red Pondwd
berchtoldii **
272 Small Pondwd
compressus **
273 Grasswrk Pwd
crispus
274 Curled Pwd
friesii **
275 Flat-std Pwd
natans
276 Brd-lvd Pwd
perfoliatus
277 Perfol Pwd
polygonifolius **
278 Bog Pondwd
praelongus **
279 Long-std Pwd
Potentilla anglica **
280 Trlng Tormntl
palustris
281 Marsh Cinqfl
Poterium sanguis
282 Salad Burnet
Primula veris
283 Cowslip
Prunus avium
284 Wild Cherry
cerasifera
285 Cherry Plum
domestica
286 Wild Plum
padus
287 Bird Cherry
Pulicaria dysenterica
288 C Fleabane

Quercus petraea
289 Sessile Oak

Ranunculus aquat *
290 C Watrcrowft
auricomus
291 Goldilocks B
R. fluitans **
292 River Wtrcft
hederaceus **
293 Ivy lvd Crwft
lingua
294 Gr Spearwort
omiophyllus **
295 Rd lvd Wcwft
sceleratus
296 Celery lvd Cr
Raphanus raphan
297 Wld Radish
Reseda luteola
298 Weld
Rhamnus cathartic
299 Buckthorn
Rhinanthus minor *
300 Yel Rattle
Rhododendron pont
301 Rhododendron
Ribes nigrum
302 Blk Currant
rubrum
303 Red Currant
uva-crispa
304 Gooseberry
Rorippa amphibia
305 Gr Ylw-cress
islandica
306 Marsh Y-cr
sylvestris
307 Creeping Y-cr
Rosa rubiginosa *
308 Sweet Briar
Rubus idaeus
310 Raspberry
Rumex conglomer
311 Clustd Dock
hydrolapathum
312 Water Dock
sanguineus
313 Wood Dock

Sagina apetala **
314 Anl Pearlwt
Sagittaria sagittif
315 Arrowhead
Salix alba
316 White Willow
aurita **
317 Eared Willow
caprea
318 Goat Willow
fragilis
319 Crack Willow
viminalis
320 Osier
Sanicula europaea
321 Sanicle
Saponaria officin
322 Soapwort
Sarothamnus scop
323 Broom
Saxifraga granul
324 Meadow Saxif
tridactylites
325 Rue-lvd Sax
Scabiosa columbar
326 Sml Scabious
Schoenoplectus lac
327 C Club-rush
Scirpus sylvaticus
328 Wd Club-rush
Scleranthus annuus
329 Anl Knawel
Scrophularia auric
330 Water Figwt
Scutellaria galeric
331 Skullcap
Sedum acre
332 Biting Stcrp
forsteranum
333 Rock Stcrp
reflexum
334 Rfld Stncrp
telephium
335 Orpine
Senecio aquaticus
336 Marsh Ragwt
erucifolius
337 Hoary Ragwt
squalidus
338 Oxford Ragwt
sylvaticus
339 Hecth Gdsel
viscosus
340 Sticky Gdsel
Sherardia arvens
341 Field Maddr
Sieglingia decumb
342 Heath-grass
Silene alba
343 Wh Campion
vulgaris
344 Bladr Camp
Sinapis alba
345 Wh Mustrd
Solanum nigrum
346 Blk Nightshd
Solidago virgaurea
347 Goldenrod
Sparganium emersum
348 Unbrd Bur-rd
Spergularia rubra
349 Sand Spurrey
Stachys arvensis
350 Fld Woundwt
palustris
351 Marsh Wndwt
Stellaria alsine
352 Bog Stitchwt



Grid square SO48

Species OPHIOGLOSSUM VULGATUM

Recorder H. HAND

Date 1970 - 1982

09 19 E 08 18	29 39 J 28 38	49 59 P 48 58	69 79 U 68 [✓ 78]	89 99 Z [✓ 88] 98
07 17 D 06 16	27 37 I 26 36	47 57 N 46 56	[✓ 67] [✓ 77] T 66 76	[✓ 87] 97 Y 86 96
05 15 C 04 14	25 35 H 24 34	45 55 M 44 54	65 75 S 64 74	85 95 X 84 94
03 13 B 02 12	23 33 G 22 32	43 53 L 42 52	63 73 R 62 72	83 93 W 82 92
01 11 A 00 10	21 31 F 20 30	41 51 K 40 50	61 71 Q 60 70	81 91 V 80 90

Records

So 477882 - on roadside

So 470875 - In short turf in field

So 465872 - " " " " " on limestone/

mudstone below Wenlock Edge.

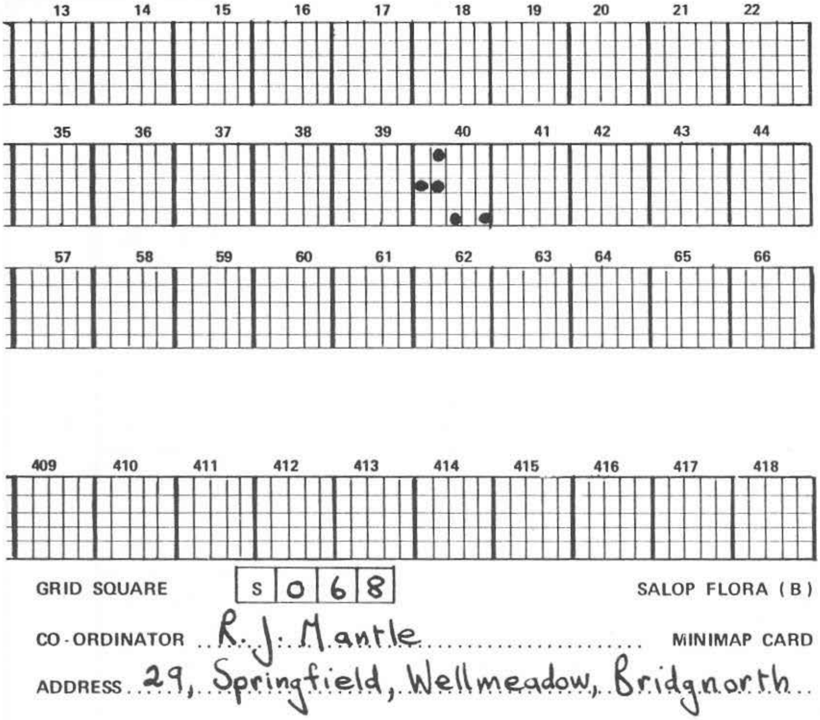
So 480880 } Recorded by Shropshire Biological

So 481878 } Records Centre, Ludlow.

So 479876 by roadside through a wood.

BRC GEN 4

Figure 1.3 *'Grid square' card used to record rare (C) species and critical taxa, indicating tetrad lettering and 1 km square numbering.*



GRID SQUARE S 0 6 8 SALOP FLORA (B)

CO-ORDINATOR R. J. Mantle MINIMAP CARD

ADDRESS 29, Springfield, Wellmeadow, Bridgnorth

Figure 1.4 *Two portions of a 'minimap' card. A single card enabled the co-ordinators for the 10km grid squares to make species distribution maps on a tetrad basis for up to 430 B species or aggregates. A specimen entry has been made for B species 40* (Calluna vulgaris) *in grid square SO68.*

to work as a volunteer. She also dealt with records of hybrids, which some recorders collected on an optional XX card, and directed the first stage of the field survey conducted by the SCMS in the south of the county.

One object of the Flora Project was to provide data of use in conservation, so that when the Shropshire Conservation Trust (now the Shropshire Trust for Nature Conservation) began its habitat survey under Mr W V Prestwood in 1978 co-operation between the project and the survey developed rapidly. By early 1980 the habitat survey was complete, having discovered 620 prime conservation sites worthy of protection. At about this time it became possible to fund a project officer, whose time was to be shared equally between liaison, recording and research connected with the Flora and direct conservation work for the SCT. This post was taken by Mr Prestwood who made a substantial contribution to the later stages of the Flora, especially the species notes on which he worked with CAS.

The later stages of the work were concerned with filling in gaps, a process in which a number of volunteers – to whom we are especially grateful – made rapid surveys of under-recorded squares. There was also the matter of checking doubtful records: if there was any doubt the editors either arranged for a second opinion or required voucher material. In the last year or two some recorders also assisted by using associate species recording cards, designed to determine the floristic groupings with which particular plants are associated (see Chapter 10). BSBI referees assisted with some of the critical taxa and we are grateful for their help. It should be realised, however, that a major thrust of this Flora was concerned with ascertaining the underlying environmental requirements of the plants, so that their distributions could be not only determined but understood. This aspect of the work is clearly demonstrated in Chapters 5–10.

It is appropriate to make a final comment on the use of the three frequency classes for recording purposes, a practice well adapted to the needs of our area and organisation. This proved immensely valuable in speeding the rate of recording. Many observers remarked how much faster they worked once they had completed their A cards and could ignore the quite large number of common species which were found in almost every tetrad. We would commend the use of this practice for other surveys but add the rider that the A, B and C groups be carefully selected by someone with a good knowledge of the region. In many parts of eastern England, for example, *Oxalis acetosella* would be a B species indicative of primary woodland, whereas in our damper and more western countryside it is much more common, frequently occurring in hill grazings and secondary woodlands.

The main records of the Shropshire Flora Project will be deposited along with the results of the habitat survey at STNC headquarters in Shrewsbury, with copies of much material at the Biological Records Centre, Ludlow.

Individual contributors to the Flora records

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Miss A Dyer

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Dr R Elliott
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Mr H H Fowkes
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Miss M S Fuller

Miss K M Gardner
Miss J Green
Mr P Green
Mrs J Greenhalgh

Mr H Hand
Mr E Hardy
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Dr C West
Mr M Wigginton
Mrs K M Willcox
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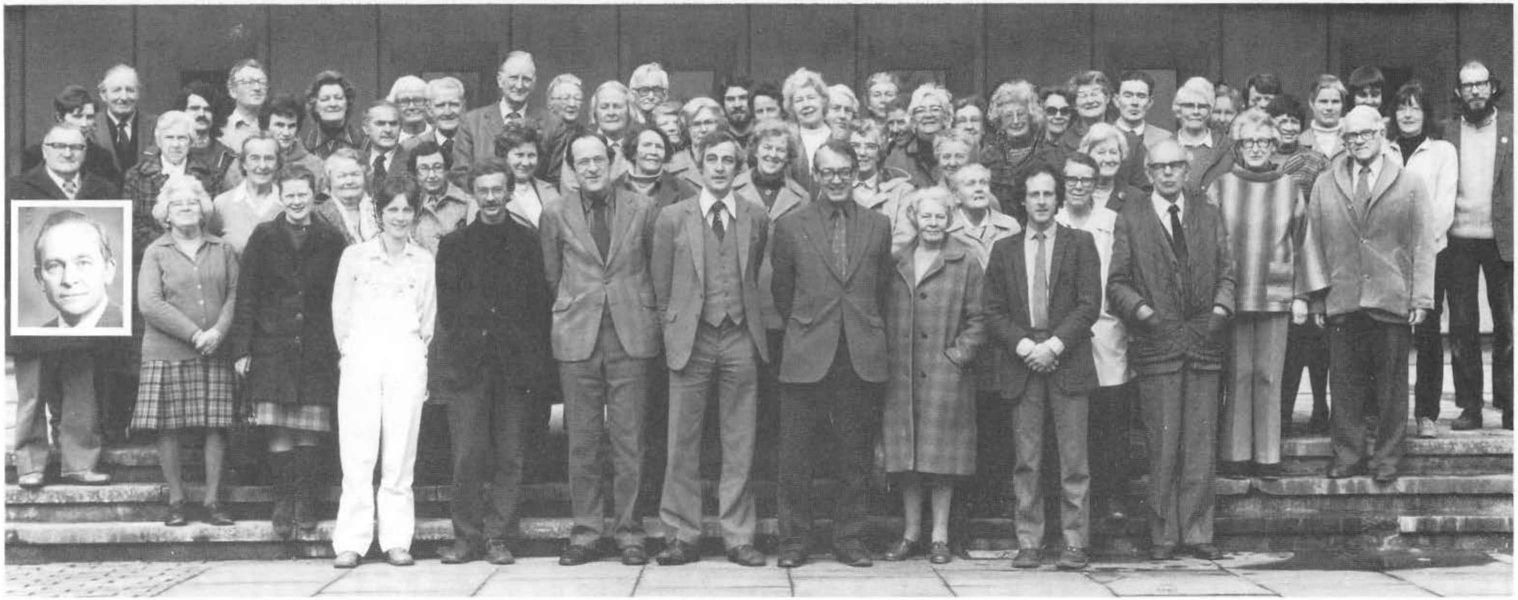
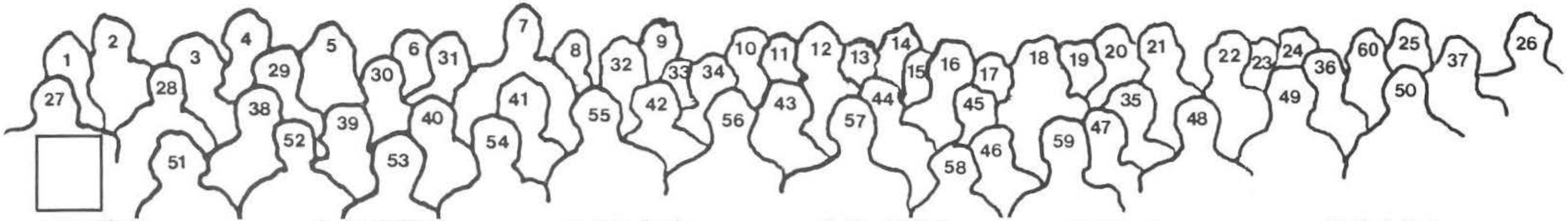
Miss P Willis
†Mr E A Wilson
†Mr E Wolfe
Mrs P A Wolseley
Mr and Mrs B Wood
Mr E P Woodcock

Members of the Border Field Club, Oswestry

† deceased

The editors and many of the contributors to the Flora pictured at the Shirehall, Shrewsbury on 20 March 1982.





1 Kate Thorne
2 Ned Wolfe
3 John Bingham
4 Bill Thompson
5 Ellen Heywood-Waddington
6 Joyce Roper
7 Stan Turner
8 Peggy Daniels
9 Dan Daniels
10 Paul Woodcock
Frank Perring (inset)

11 Ann Williams
12 K M Willcox
13 Helen Matthews
14 Melody Ryle
15 Cecilia Radcliffe
16 Winifred Hutton
17 Aileen King
18 K M Saville
19 Hil Burke
20 Marjorie Wainwright

21 Brian Fowler
22 Mary Fuller
23 Rachel Jefferson
24 Betty Roberts
25 Trina Paskell
26 Chris Walker
27 H Webster
28 Gwyneth Jones
29 Audrey Ashwell
30 J T Swain

31 Harold Walker
32 Sheila Nelson
33 P Dickerson
34 Joyce Warren
35 Joan Connell
36 Jane Ing
37 Pat Parker
38 Mary Hignett
39 Dorothy Evans
40 Audrey Franks

41 Mary Turner
42 Margot Daniel
43 O Hunter
44 Tavia Maclean
45 Lorna Johns
46 Kay Gardner
47 Joyce Lee
48 P W Hutton
49 Anne Gilbert
50 Hugh Dibb

51 Doris Pugh
52 Pat Waite
53 Diana Kingham
54 Ian Trueman
55 Philip Oswald
56 Charles Sinker
57 John Packham
58 Helen Davidson
59 William Prestwood
60 J Roberts

2 History of botanical recording

Touch-me-not balsam (Impatiens noli-tangere)

2.1 Introduction

WHEN THE Shropshire Flora Project was begun it was widely assumed that the county was botanically one of the least well known in England. The last Flora of the whole county, covering the flowering plants only, had been published over 130 years previously (Leighton 1841), and the only other approximations to a County Flora were a chapter entitled *Botany* in the first volume of the Victoria History of Shropshire (Hamilton *et al* 1908) and *Handlist of the Shropshire Flora* compiled by L C Lloyd and E M Rutter and published by the Caradoc and Severn Valley Field Club in 1957. Both were essentially lists of plants with numbers appended to indicate the "botanical divisions" from which they had been recorded.

It is true that botanical activity—and especially recording—in Shropshire had been at a relatively low ebb for fifty or sixty years, but before that the county had been quite thoroughly investigated by a succession of competent botanists, many of whose records were to have been published in a new County Flora which sadly never materialised (see 2.12), though they form the basis of the two lists mentioned above and fortunately still survive in manuscript if not in published form.

2.2 Early travellers and gardeners

John Leland (*c* 1506–1552) provides early botanical records, especially of trees and shrubs, for some counties in his remarkable account of his *Itinerary*, undertaken between about 1536 and 1542 as Henry VIII's Keeper of Libraries to "search the Libraries of all Cathedrals, Abbies, Priories, Colleges, &c., as likewise all other places wherein Records, Writings, and whatsoever else was lodged that related to Antiquity" (Adnitt 1881). Though he spent some time in Shropshire, the only strictly botanical record for the county that he provides is of "great treas of oke" growing "in the toppe of the hille" at "Hene Dinas" or Old Oswestry (Smith 1907–1910). He does however also tell us that the Wrekin stood "as a Pharos, baren of wood", with "in the toppe . . . a delicate playne ground beringe good fine gresse", and that "Ther be founde in morisch and mossy ground a vii. miles from Shrobbesbyri [Shrewsbury], and yn other places of the Shire, fyr-woodde [*Pinus sylvestris*] rootes, and also the hole trees hewen downe in olde time; but of whom, or for what cause, no man there can telle." Leland continues: "They finde them lying yn the grounde, sumtime a foote or ii. depe, sumtime a v. or vi. foote depe. Many of them be of greate lengthe, and withowt twysxe. Yn brenning they smel welle." In a similar passage about "Cholmeley" in Cheshire he makes it clear that such trees were found "in diggin in this mosse or more for petes or turves" and that he saw "no fyrre trees grouing".

Leland also makes some interesting references to the Meres (or "pooles" as he usually calls them), including "a veri faire poole" at Brown Moss (unnamed); "Martine [Marton] Poole, meately large and plentiful of fische . . . in a faire valle . . . iii. miles from Montgomery"; "very fair polis" at Ellesmere; "Blakein" in "the large parke of Blakmer"; and a "great poole callyd Hurmer a 6. myles from Shrobbesbyry by northe"—drained in the middle of the sixteenth century (Gough 1875 and 1981; see also 3.6)—from which "yssuythe out . . . a broke, and aftar resortith to an othar poole callyd [mysteriously] Wibbemere, and here, as the moste commune sayenge is, risethe Roden ryver". Elsewhere Leland mentions "Harmer Pole a mile [*sic*] from Shrobbesbyri" in a list of rivers in Shropshire. He comments: "It is to be supposid that thes pooles . . . dreane the moist places about them, and so having no place to issue owt stagne there. Sum be likelyhod have begon of marle pittes." He also suggests that some "peraventure hath gatheryd . . . water, wher greate plenty of turves and petes hath bene diggid". But he does not, as stated by Carter (1960), mention "water-bloom" as occurring "in

Hanmere, Ellesmere, Roston [Rostherne Mere in Cheshire] and Blakemere".

A manuscript herbal, *Llysieulyfr Meddyginiaethol*, written in Welsh before 1600, probably by **William Salusbury** (1520–?1584), the first translator of the New Testament into Welsh, and published in 1916, provides two specific plant records for Shropshire—*Viscum album*, which the author saw with berries in March near the Ceiriog bridge [probably Pontfaen near Chirk] and without berries all the way to Ludlow, and *Typha latifolia* at Whittington Castle (Gunther 1922, pp. 238–239 and 242; Ellis 1972). A relative of William, Sir **John Salusbury** (1567–1612) of Lleweni (or Llywene) in Denbighshire, owned a copy of John Gerarde's (1597) *Herball*, now in the library of Christ Church, Oxford, in which he noted plants that he found in 1606–1609. His son, Sir **Henry Salusbury** Bart, made some additions, perhaps in 1627; these include *Scrophularia nodosa* "in the Orchard at Chirck Castle" (Gunther 1922, pp. 238–239 and 244).

The apothecary **Thomas Johnson** MD (Oxon) (*c* 1597–1644) is best known for his revision of Gerarde's (1597) *Herball*, but he was also author of the first two local Floras for Britain, listing plants found in Kent and on and around Hampstead Heath (Johnson 1629 and 1632), and of the first attempt at an enumeration of the British flora (Johnson 1634 and 1641). In the revised editions of the *Herball* (Gerarde 1633 and 1636) he mentions a number of plants found in Shropshire by **George Bowles** (or Bowle) (1604–1672), who was born at Chislehurst in Kent and was at this time a medical student. In 1640 he became MD at Leyden and in 1664 an Honorary Fellow of the College of Physicians (Raven 1947, p. 294). Bowles was a friend of the Revd **William Coote** (*fl* 1590s–1640s), who was a Fellow of Trinity College, Cambridge, and was presumably resident in Shropshire as chaplain to that remarkable religious philosopher of the early seventeenth century, Lord Herbert of Cherbury (1583–1648). Most notable are *Impatiens noli-tangere*, the "codded or impatient Arsmart . . . first found to grow in this kingdome by the industrie of my good friend M^{r}. *George Bowles*, who found it . . . first in Shropshire, on the bankes of the riuer Kemlet [Camlad] at Marington in the parish of Cherberry, . . . but especially at Guerndee [Wernddu] in the parish of Cherstocke [Church Stoke], halfe a mile from the foresaid Riuer, amongst great Alder trees in the highway", and *Senecio fluviatilis* (or *sarracenicus*), the famous herbalists' simple called "Saracens Consound"—not, as implied by Carter (1960), "Golden-rod", despite Johnson's calling it "the true *Solidago*"—a naturalised plant "found . . . by my kinde Friends M^{r}. *George Bowles* and M^{r}. *William Coot*, in Shropshire in Wales [*sic*], in a hedge in the way as one goeth from Dudson [Dudston] in the parish of Cherbery to Guarthlow" (Gerarde 1633, pp. 446 and 428). Both of these were found in 1632, when Bowles seems to have made a considerable botanical tour (Raven 1947, pp. 295–296), picking up Coote at Chirbury, going on to Machynlleth (recording *Wahlenbergia hederacea* for the first time in Britain—Johnson actually says "in England"!—"in Montgomerieshire . . . and in all the way . . . to the sea side"), and ending with a visit to Richard Herbert at Ellesmere, in whose grounds at Birch he found *Teesdalia nudicaulis* "in great plenty"—another first record for the British Isles (Gerarde 1633, pp. 452 and 250; Clarke 1900). He also found *Cicuta virosa* "in the ditches about Ellesmere, and in diuers ponds in Flint-shire" (Gerarde 1633, p. 257) and—according to William How BA (Oxon) (1620–1656) in his *Phytologia Britannica* of 1650—*Andromeda polifolia* "In great quantity at *Birch* in the Moores of *Ellesmere* in *Shropshire*" (p. 106). John Parkinson (1567–1650) in his *Theatrum Botanicum* of 1640 mentions on p. 1053 that Dr Coote found *Drosera anglica* (or possibly *D. intermedia*) at Ellesmere, and this record is repeated by How (1650) on p. 105 ("Ros solis syl. longifolius").

In 1639 Johnson himself undertook a botanical tour of North Wales with three companions (Johnson 1641). He travelled through "*Bremicham* Vulcani municipium" [Vulcan's town], Wolverhampton and Newport, Shropshire, to "Shackerforth-Mill" [Shakeford], where he observed "Vaccinia Palustria [*Vaccinium oxycoccos*] & Acetosam maximam [perhaps a large form of *Rumex acetosa* but not certainly identifiable] loco uliginoso crescentia [growing in a boggy place]" before proceeding to Chester, where he was joined by Walter Stonehouse (1597–1655) from Yorkshire. They entered Wales by way of Flint Castle and eventually reached Montgomery, where they stayed with Lord Herbert of Cherbury. Next day they went straight to the village of "*Guerndee*" and there in an alder grove they collected seeds of "Persicaria siliquosa" (*Impatiens noli-tangere*) growing plentifully there, and they also dug up "Solidago Saracenica" (*Senecio fluviatilis*) between "*Dudson* & *Guarthlow*", before Stonehouse returned to Yorkshire through Shrewsbury and the rest of the party returned to London through Ludlow, Leominster, Hereford, Gloucester and Oxford.

Edmund Gibson's (1695) edition of *Camden's Britannia* lists in col 554 three "*More rare Plants growing wild in* Shropshire"—*Eriophorum vaginatum* ("*Hare's-tail-Rush*") "On Ellesmeer meers [?moors] in great abundance" (probably How's (1650) "Gramen plumosum elegans" or "*Fetched grass* ", which he attributed to Bowles); "*Codded Arsmart, or Touch-me-not*", quoting from and referring to p. 446 of Gerarde (1633); and *Andromeda polifolia* ("Rosmarinum sylvestre minus", i.e. lesser wild rosemary) from Birch. These records reappear on pp. 688–689 of Volume IV of Thomas Cox's (1727) *Magna Britannia et Hibernia* together with a list of 26 "rare Plants found in this County" sent by a "Student in Physick". Oddly, the same three species are repeated in this list, but with shortened entries and differing names, "*Persicaria siliquosa*" for example being called "Quick-in-Hand". But most of the records are from the south of the county; they include a few plants recorded by Littleton Brown (see 2.3), but the nomenclature seems to be different from his, being generally Gerarde's, though the order of the plants is John Ray's, as could be expected from Brown; so the botanist who sent in the records remains unidentified. Among the more interesting plants that can be almost certainly identified are *Lycopodium clavatum* ("*Lycopodium*; Club-masse [*sic*]") "found on Stiperstone-Hills"; *Hypericum elodes* ("*Ascyron Palystre*; Marsh St *Peter*'s Wort") "by *Liddum Heath*" (Lydham, near Bishop's Castle; see 2.3); *Vaccinium vitis-idaea* ("*Vaccinia Rubra*; Red Whorts, or Cranberries"—not *V. oxycoccos* despite this last name) and *Empetrum nigrum* ("*Erica Baccifera*; Black-berried Heath") on the Stiperstones (see 2.3 and 2.6); *Pinguicula vulgaris* "near *Longment*" (Longmynd); *Inula conyza* ("*Baccharis*; Ploughman's Spikenard") "in the Road between *Onebury* and *Ludlow*"; and *Epipactis palustris* ("*Helleborine Palustris*; Marsh Hellebore") "in *Oakley* Wood" near Bishop's Castle (see 2.6).

The Salusbury family seems to have been only one of a number of families in North Wales and Shropshire in the seventeenth century who took an interest in horticulture and botany (Roberts 1980, p. 8). **John Rea** (*fl* 1620s–1677), the author of *Flora* or *A Complete Florilege* (1665), kept one of only three nursery gardens of importance out of the London area, at Nortons End, Kinlet, near Cleobury Mortimer, for over half a century till his death. He had the largest collection of tulips in England, 200 varieties, and offered, for example, 31 varieties of roses and 44 of plums (Sykes 1956).

It is perhaps no coincidence that among the manuscript notes that William How added to his own copy of *Phytologia Britannica* he recorded "Paralysis inodora calycibus dissectis, Raii: not farre from Kynlett in Worcestershire [*sic*]: P. Par." (Gunther 1922, p. 283). The reference is to page 245 of John Parkinson's (1629) *Paradisus*, and the plant is a freak form of the cowslip (*Primula veris*), "Oxelips with iagged huskes" with "a greene huske vnder each flower, but diuided into sixe severall small long peeces". Such freak cowslips and primroses, whether discovered in the wild or raised in cultivation, were much prized in contemporary gardens, and both Parkinson (1629) and Rea (1665) describe a number of them.

Another recognised leader in horticulture at this period was Sir **Thomas Hanmer** Bart (1612–1678) of Bettisfield, just out of Shropshire in Flint Maelor. He was a friend of John Rea and also of John Evelyn. The former dedicated his *Flora* to him, and his own manuscript Garden Book of 1659, apparently intended for publication, survives (Hanmer 1933).

Yet another keen local gardener was **Edward Lloyd** (1609–1662) of Llanforda, south-west of Oswestry, who wrote to his mother in 1645: "I have been charged with foley for my gardens and walkes, for my wilderness and ffountaine." (Roberts 1980, p. 7). His son, also **Edward Lloyd** (1635–1681), was likewise a knowledgeable gardener and "something of a scientist" (Roberts 1980, pp. 11–14). In about 1679 or 1680 he took into his employment **Edward Morgan** (1610s–1689), a native of Glamorgan and discoverer of the polyanthus, another *Primula* sport, wild in Warwickshire; he had been superintendent or "herbarist" of the Physic Garden in Westminster and interpreter to Thomas Johnson during his Welsh tour in 1639 (Johnson 1641; Raven 1947, pp. 288, 304 and 317–318; Roberts 1980, pp. 13–14). Morgan, who had taken pupils at Westminster, did so in Wales also and included "Briddin hills" as well as "snowden fforest" among the places where he put them to work; it seems likely that one of these was his new employer's son, Edward or "Neddy" (Roberts 1980, pp. 15–16).

2.3 Oxford connections

Edward Lhwyd (Lhuyd, Llwyd or Lloyd) (1660–1709) was the illegitimate son of Edward Lloyd the younger and Bridget Pryse, a member of one of the major families of north Cardiganshire, the Pryses of Gogerddan. Both Llanforda and Glanffraid, at Llandre in the parish of Llanfihangel near Aberystwyth, have been claimed as his birthplace; but a note in a handwritten book used by Lhwyd himself (Llanstephan MS 185, p. 120, quoted by Ellis 1908) states that "Mr. Edward Lhwyd was born at Lappiton parish . . . 3 days before Michaelmas . . . according to Catherine Bowen, his nurse"; this is presumably Loppington, west of Wem, in Shropshire. He probably attended Oswestry Grammar School and may have taught there before going up to Jesus College, Oxford, in October 1682 to read law. A surviving notebook of his father's mentions "Neddy gone a-simpling" on the Llanforda estate in the previous year, and other entries, some in Lhwyd's own hand, record botanical finds, for example on Cadair Idris, Plynlimon and the mountains of Snowdonia and "about Aber Dyfi" (B L Add MS 15070, quoted on p. 16 of Roberts 1980). Recently, Chater (1983) published further material from this manuscript, which in fact consists of three note-books bound together. The middle one was written by Lhwyd himself, who recorded "Sedum Alpinum trifido-folio, major [*Saxifraga hypnoides*] . . . on Breiddin hil in Mountgomery shire" and *Rorippa sylvestris, Lythrum salicaria, Lysimachia nummularia* and *Scutellaria galericulata* or *S. minor* (Lhwyd seems to have been undecided which) "In ye ditches before you passe over Severn goeing to Breiddin hill" (i.e. in Shropshire). From "Gwern Vele" [Bele Alder-swamp, on Bele Brook?] he recorded *Mentha pulegium* and *Matricaria recutita* ("Chamaemelum vulgare P.").

It is clear that Lhwyd was already an accomplished botanist before he arrived in Oxford, where he seems never to have taken his degree but interested himself in chemistry and other scientific studies. In 1690 Lhwyd succeeded Dr Robert Plot, to whom he had been formally appointed assistant in 1687, as the second Keeper of the Ashmolean Museum, a post he held till he died. He became a notable conchologist, geologist, antiquary and philologist and was described by Sir Hans Sloane (1660–1753) as "the best Naturalist now in Europe". He was made an honorary MA of the University of Oxford in 1701 and was elected a Fellow of the Royal Society in 1708.

In botanical circles Lhwyd is best known as the discoverer in Snowdonia of the plant named after him, *Lloydia serotina;* but he was the first to record not only "the distinctive alpine flora of British mountains" (Desmond 1977, based on Gibson 1695, col 667) but also some at least of the rare plants of Craig Breidden, at the foot of which, at "Krew green", his nurse Catherine Bowen lived, certainly until 1702 (Llanstephan MS 185, as above). John Ray (1627–1705) recorded Lhwyd's most interesting discoveries in his later botanical works; thus his 32-page supplement to his *Catalogus Angliae, Fasciculus Stirpium Britannicarum* (Ray 1688), includes for the first time *Potentilla rupestris* and *Veronica spicata* ssp. *hybrida* from "Craig Wreidhin" and the third edition of his *Synopsis*, published posthumously (Ray 1724), has an engraving of the latter as Plate XI (reproduced on p. 71 of Gunther 1945) and adds *Lychnis viscaria* from the same site. Lhwyd himself incorporated the last two of these three species in a list of 63 "*More rare Plants growing in* Wales" in his chapters on the Welsh counties in Edmund Gibson's revised edition of *Camden's Britannia* (Gibson 1695, cols 699–702). Unfortunately he died before he could complete his planned Natural History of Wales, which probably would have included part of Shropshire judging by the fact that the introduction to his initial questionnaire, *Parochial Queries* (Lhwyd 1696), promised that he would either come himself or send one of his "Assistants into each Parish throughout *Wales*, and all those in *Shropshire* and *Herefordshire*, where the Language and the Ancient Names of Places are still retain'd". At his death Lhwyd's collection of manuscripts was sold and subsequently most were destroyed in three separate fires (Gunther 1945, pp. 554–557; Rees and Walters 1974).

Various plants growing around Oswestry, such as *Scrophularia vernalis, Pentaglottis sempervirens* and *Gymnocarpium robertianum*, are reputed to have been introduced by Lhwyd (Salwey 1855; Carter 1960, quoting *Bye-gones* 1874); but it seems just as likely that his father or grandfather was responsible or, more probably, Edward Morgan, particularly in the first case as the yellow figwort still grows as a weed in the Chelsea Physic Garden, the successor of the one he tended at Westminster (Mrs Marjorie Wainwright, pers comm, 10 October 1982).

The Revd **Littleton Brown** (1699–1749) was born at Bishop's Castle, matriculated at Balliol College, Oxford, at the age of 16, graduated as BA in 1719 and as MA in 1722, and became a Fellow of the Royal Society in 1729. He was Vicar of Kerry, near Newtown, from 1732 to 1749 but seems to have lived at Bishop's Castle (Willans 1918). Presumably at Oxford, he met **Johann Jakob Dillenius** MD (1684–1747), a German botanist who came to England in 1721 at the request of William Sherard (1659–1728) and anonymously produced the posthumous edition of Ray's *Synopsis* mentioned above, later becoming the first Sherardian Professor of Botany (1735–1747) under the terms of Sherard's will. Dillenius and Brown shared a special interest in mosses and other non-flowering plants. Sherard, writing to Richard Richardson MD FRS (1663–1741) from London on 12 February 1726, mentioned that there was "in town a gentleman, bred at Baliol College, Mr. Brown of Shropshire, just by Wales: he is the keenest botanist I have met with, and knows most of the plants in the *Synopsis*. Dr. Dillenius has been a moss-cropping with him: he has an excellent eye." (Turner 1835, pp. 232–233).

In a letter to Dillenius dated 14 January 1726 (MS Sherard 202, quoted by Druce and Vines 1907) Brown sent his "poor observations in Botany" with references to Dillenius's edition of Ray's *Synopsis.* Many of his records are from Shropshire and they include *Gymnocarpium dryopteris* "common in Shady woods near Bishops-Castle"; *Cardamine impatiens, Dianthus deltoides, Vicia sylvatica* and *Trifolium scabrum*, all of them near Bishop's Castle; *Hypericum montanum* "on ye right hand side of ye road between Corfton & Munslow"; *H. elodes* "in ye great bog on Lyddum's Heath" (see 2.2); *Rubus saxatilis* "on ye top of Comb-Floy'd near Bishops-Castle" (a locality unfortunately not now identifiable); *Sedum forsteranum* "on ye sides of an old camp called Borough ditches 4 m: from Bpps Castle"; *Vaccinium vitis-idaea* "Upon ye Stiperstones" (see 2.2); *Narthecium ossifragum* "in ye bogs on ye side of Longment" [Longmynd]; and *Colchicum autumnale* "In ye meadows in Corve dale plentifull". Brown also reported Ray's "Fine-leav'd white Maiden-hair, with Leaves divided like bastard Hemlock" (Ray 1724, p. 126, no 8) "Amongst ye fragments of ye rocks upon ye Stiperstones". Because the specimens from elsewhere that are so labelled in Dillenius's herbarium "are all *Cystopteris fragilis*", Druce and Vines (1907) record this species (p. lxx), but it seems impossible on ecological grounds; in any case Brown recorded *C. fragilis* differently as Ray's "Fine-cut Stone-Fern, with slender and brittle Stalks" (Ray 1724, p. 125, no 7) "Upon ye rocks at ye great cataract call'd Water break its neck two miles above Radnor" (Druce and Vines 1907, p. 141). The letter of 14 January 1726 also provides the earliest record of *Geranium columbinum* for vice-county 47—"on ye highest rocks of ye round-town [Roundton, near Old Church Stoke] a hill in Montgomeryshire". Notes in Dillenius's writing show that another letter from Brown, of 24 June 1726, provided the first Shropshire records of *Diphasiastrum alpinum* and *Listera cordata* ("Lycopod. Sabinae facie & Bifolium minimum"), "on ye top of ye Stiperstones"; the latter was also seen by Leighton "immediately below the Devil's Arm-chair" (Leighton 1841, p. 433).

In July of the same year Dillenius set out on a botanical tour with **Samuel Brewer** (1670–1743).

From Gloucester they went through Worcester to Shrewsbury, near which on 25 or 26 July they found *Limosella aquatica* "ad orbitas udas" [in wet ruts], *Galeopsis speciosa* "inter hordeum" [among barley] (also recorded by Littleton Brown "Every where about Bishops-Castle") and what Druce and Vines (1907) suggest was *Fumaria purpurea* (if so, the first record of this species, which is endemic to the British Isles). The description "flore albicante apice purpureo, . . . absque claviculis scandens" [with a whitish flower with a purple tip, . . . climbing without tendrils] rather suggests *F. muralis* ssp. *boraei.* "Beyond Norbury in a boggy Meadow" they found *Polygala serpyllifolia* (claimed by Druce and Vines as "first British record") and "varietas procumbens" of *Genista anglica.* At Bishop's Castle they picked up Brown—later described by Dillenius as "a young ingenious clergymann" (Turner 1835, p. 290)—and with him they visited the Stiperstones on 29 July and found *Diphasiastrum alpinum* (not as stated by Druce and Vines *Lycopodium inundatum*) before setting off for a tour of Wales on 2 August. On the return journey Dillenius and Brewer travelled from "Orswestri to Shrewsbury via Nucked [Knockin] Heath 3 or 4 miles from Orsw.", recording "Quercus pedic. longo" (*Q. robur*) in the hedges and *Taxus baccata*, "qui in omnibus Walliae comitariis viget tantae amplitudinis ut quercui aequet" [which flourishes in all the counties of Wales to such a size—or perhaps breadth—that it equals the oak] (MS Sherard 206, quoted by Druce and Vines 1907, pp. lii–liii).

In October 1745 Littleton Brown wrote to Dillenius saying that he had been "twice or thrice this summer in pursuit of ye Solidago Saracenica [*Senecio fluviatilis*] which Dr Bowles has mentioned to grow between Dudson & Gwarthlow" (see 2.2) but "could meet with no such Plant so suppose he extirpated it".

2.4 Two eighteenth-century Shropshire gentlemen

Robert More (1703–1780) of Linley Hall near Bishop's Castle was a pupil and friend of Carl Linnaeus (1707–1778), "the father of modern botany", who may possibly have visited him at Linley. He took his BA at Cambridge in 1724 and was elected FRS at the early age of 26. Most of his botanising seems to have been done abroad and he sent seeds from plants he found wild in Spain to Philip Miller, author of the famous work of reference, *The Gardener's Dictionary*, first published in 1731 (Hayward 1956). He is also said to have planted the first larch (*Larix decidua*) in Britain at Linley, one day ahead of the Duke of Atholl at Dunkeld; the larch avenue beside the River Onny "was formerly one of the sights of Shropshire" (Hamilton *et al* 1908; Hayward 1956).

Richard Hill Waring (1718–1798) was born in Shrewsbury and became Recorder of Oswestry, living at Hayes by the road to Llanrhaeadr. Through his marriage in 1760 to the daughter and sole heiress of Sir George Wynne of Leeswood in Flintshire and Ince in Cheshire, he inherited properties there also (Warren 1899, p. xci). He was elected FRS in 1769. As with Lhwyd, several plants growing in the vicinity of Oswestry have been considered "stragglers" from his garden (Nightingale 1813, p. 269; Carter 1960). Salwey (1855) mentions that *Teucrium chamaedrys* was formerly found "upon an old wall (since taken down) at the Hayes", and Leighton (1841, p. 298) says that J F M Dovaston (see 2.7) had informed him that *Cymbalaria muralis* "was first introduced into Shropshire" by Waring "at the Hayes". Waring himself, in a letter written to the Hon Daines Barrington—to whom the letters in the second half of Gilbert White's (1789) *The Natural History of Selborne* are also addressed—from Leeswood on 24 December 1770 listed locations for, and in some cases commented on the distribution of, certain plants in Shropshire and nearby counties (Waring 1772); he mentions (p. 368) this species as having occurred for "about fifty years" on "the brick walls at Brinkinnalt, the seat of Lord Dungannon, in Denbighshire, abundantly"; so perhaps this is where he obtained it for his own garden.

Interesting records in this letter from the region covered in the present Flora include *Trollius europaeus* "in the meadows at Hayes, Salop, plentifully"; *Corydalis claviculata* ("Fumaria cum capreolis, J.B.") "on the Wreken, and on Arcal-hill, near it"; *Hypericum androsaemum* "In a thicket at Hays, Salop, and elsewhere; but not common"; *Saponaria officinalis* "by the road-side between Llanamonerch and the new-bridge, Salop"; *Potentilla palustris* "on the moss near Hampton"; *Smyrnium olusatrum* ("Hipposelinum sive Smyrnium vulgare, Park.") described as "certainly very rare" and seen by Waring "only in the two inner courts of the castle of Ludlow" and in three other places, in Suffolk and Essex and at Lambeth; "Foeniculum sylvestre, Park." "On the castle-bank at Shrewsbury" (presumably *F. vulgare*, though one might suspect an error for *Smyrnium olusatrum* in the absence of the previous record; see 2.8: W. A. Leighton); *Myrica gale* on a bog "near the Decoy, between Oswestry and Babin's-wood"; *Empetrum nigrum* "On Salatin-mountain"; *Atropa belladonna* ("Solanum lethale Park.") "at Vron, and other places near Chirk-castle, Denbighshire"; *Verbascum nigrum* "By the highway and park-side, almost opposite to Shavington (vulgò Shenton) hall, Salop, for about 100 yards, plentifully"; *Orobanche rapum-genistae* "at Hayes in Shropshire, with broom"; *Nepeta cataria* "about Shifnal, Norton, Atcham, Nesscliff, Oswestry, and on the brow of the hill above the river Ceiriog on the road from Oswestry to Chirk"; *Teucrium chamaedrys* "Plentifully on a wall at the castle at Whittington"; *Campanula trachelium* "In Shropshire toward Tenbury"; and *Sambucus ebulus* "At Fern-hill near Whittington, and about Whittington-castle".

Waring made some pertinent remarks about the distribution and status of various shrubs and trees. For example, of *Berberis vulgaris* he wrote: "In the hedges on each side of the road from Ludlow . . . toward Stretton, . . . between Shrawarden and Ness-cliff, and between Blacker's-ford and Prees . . . but whether elsewhere than in hedges, or there spontaneous, or sown, or planted, I do not know." Of *Euonymus europaeus* he commented: "It is very infrequent this way", though he had seen it "singly, not in many places, in Shropshire"; of *Rhamnus catharticus* he wrote: "I have met with it . . . seldom in Shropshire" and of *Ligustrum vulgare*: "It seems to be rare in these counties", though he had seen it in "some hedges about Bridgenorth"; but he had not seen *Daphne laureola* "this way", nor *Viburnum lantana* "more Northward than about Southam, and between Stratford upon Avon and Henley, Warwickshire, and somewhat short of Hisham, Northamptonshire"; and it had not been his "hap to meet with" *Ruscus aculeatus* elsewhere than in Kent. He said that *Taxus baccata* was "very common, of natural growth, not only in woods and thickets, as well as hedges, but upon rocks and walls". He did not believe that any species of *Tilia* was "wild in this part of the island, however it be in other parts", and he had not been able to assure himself that any species of *Ulmus* "comes up spontaneously with us", as elms were "not apt to be increased from seeds that casually fall" and he had "not observed such offspring"; but he had reason to think that *Populus tremula* was "of spontaneous growth", though "not so well satisfied with regard to any other species of this genus". Waring's comments on two herbaceous plants are also worth recording: he noted that *Umbilicus rupestris* ("Umbilicus Veneris, Ger.") was much more common in Shropshire and thereabouts than "more Southward", and still more common further west; and the fact that he only mentions a locality in Kent for *Chamerion angustifolium* and gives three names for it ("Lysimachia speciosa, quibusdam Onagra dicta, siliquosa, J.B. Chamaenerion flore Delphinii, Park. Par.") suggests that he regarded rosebay willowherb as a rare plant still unknown in his home area (see 2.6: Joseph Babington).

2.5 Doctors and parsons

William Withering the elder (1741–1799) was the son of a Wellington doctor. He took his degree of Doctor of Medicine at Edinburgh in 1766 and became a physician at Stafford. He was befriended by Erasmus Darwin MD (1731–1802), who gained for him a partnership in a practice in Birmingham in 1775. Withering shared an interest in botany with him but later quarrelled with him and with his son Robert (father of Charles Darwin; see 2.8). He became a Fellow of the Royal Society in 1785 and a Fellow of the Linnean Society in 1791. In 1776 he published the first of three editions (destined to be followed by several posthumous ones, some of them corrected and enlarged by his son of the same name) of his Flora, *A Botanical Arrangement of all the Vegetables naturally growing in Great Britain* (with later variations of title). The second edition (1787) contains localities for less common species, including a number of Shropshire records. For example, on page 169 of Volume I Withering recorded his own observation concerning the yellow-berried variety of holly (*Ilex aquifolium*): "On the north side of the Wrekin, in Shropsh. the trees grow to a large size." He also gives Lilleshall Abbey as a locality for *Dipsacus pilosus* and Hatton for *Cicuta virosa*.

In 1785 Withering published his famous account of his use of foxglove (*Digitalis purpurea*) in his medical practice at Birmingham. He explained that in 1775 his opinion had been "asked concerning a family receipt for the cure of dropsy" which "had long been kept a secret by an old woman in Shropshire, who had sometimes made cures after the more regular practitioners had failed". He "soon found the Foxglove to be a very powerful diuretic" but for some time "gave it in doses very much too large, and urged its continuance too long". "Experience and cautious attention" gradually taught him how to use it effectively.

Jonathan Stokes (1755–1831) was born at Chesterfield and was, like Withering, an Edinburgh MD. He was a close friend of Withering and borrowed from his extensive botanical library to compile a detailed list of references to illustrations of British plants for the second edition of Withering's (1787 and 1792) *Arrangement* (Bagnall 1901, p. 70). The title page describes him as "Physician at Kidderminster", but he had only recently moved from Shrewsbury, and in the list of acknowledgements he is "Physician at Shrewsbury" (p. xii of Vol I). It seems that Withering and Stokes quarrelled over the latter's refusal to return 145 borrowed books (Bagnall 1901), and in the third edition Withering (1796) removed Stokes's name from the title page and list of acknowledgements, though admitting (p. vi of Vol I) that the "references to figures so ably executed by Dr Stokes" were "mostly preserved in this [edition]". Among the Shropshire records listed with "ST." (nowhere explained!) are *Dianthus armeria*, found in gravel near Ketley, and *Gnaphalium sylvaticum* from "Sandy heath a mile from Shiffnall on the road to Wolverhampton".

A record published by Withering (1796, Vol II, p. 152) from the Revd **Samuel Dickenson** LLB (1730–1823), Vicar of Blymhill, Staffordshire, for *Vulpia myuros* "On the road side leading from Blymhill to Shrewsbury" may or may not have been within the area that is covered by the present work; but it seems likely that he did record species within it, as he supplied a catalogue of native Staffordshire plants for Stebbing Shaw's *The History and Antiquities of Staffordshire* (1798–1801) containing about 650 vascular plants, most of them "recorded by the writer himself from the neighbourhood of Blymhill" (Edees 1972, p. 17; Bagnall 1901, p. 71).

The Revd **Edward Williams** (1762–1833) was born at Eaton Mascott. He was educated at Repton School and Pembroke College, Oxford, taking his BA in 1783. In 1786 his relative John Corbet appointed him Perpetual Curate of Battlefield and Uffington. In the next year he became a Fellow of All Souls, Oxford, which in 1817 presented him to the living of Chelsfield, Kent; but he continued to live in Shropshire till his death early in 1833 at Coton Hill, Shrewsbury. He was an able antiquary and artist and "made beautiful drawings of parish churches and county seats" (Carter 1960). He made a manuscript list of the plants he found in Shropshire including records of over 700 flowering plants (many published by William Leighton in his Flora of 1841), some 30 ferns and fern allies (many of them published by William Phillips in 1877/1878) and over a hundred each of mosses and lichens. He also made a list of rare plants "growing about Bomere and Shomere Pools", including *Elatine hexandra*, which he found for the first time in Britain "flowering in August 1798, about the eastern shore of Bomere pool near Condover, Shropshire, in a loose sandy soil" (Smith and Sowerby 1802, Vol XIV, 955). His finding of *Potamogeton alpinus* in Lilleshall Mill Pool is mentioned as *P. "fluitans"* by Smith and Sowerby (1804, Vol XVIII, 1286), who give two sites in other counties for this "new *Potamogeton* . . . here added to the British Flora"; the record is also given by Smith (1804, Vol III, pp. 1391–1392, and 1824, Vol I, p. 231), Turner and Dillwyn (1805, p. 511) and Watson (1835, p. 213) and, as "*P. rufescens* Schrad.", by Leighton (1841, p. 78), who provides (p. 511) three other localities from Williams's manuscripts. Smith also comments on the "fine specimens, in various states, sent from Shropshire by the Rev. Mr. Williams" that enabled him to refer another *Potamogeton* that he had "long been in doubt about" to "the *heterophyllum* of Schreber" (Smith and Sowerby 1804, Vol XVIII, 1285). Most of the works quoted above give Berrington Pool as Williams's locality for this species, now named *P. gramineus*, and Leighton (1841, p. 511) adds White Mere and Blake Mere.

These and other wetland and wet heathland species are among the most interesting recorded in Williams's detailed lists. Among others transcribed by Leighton are *Hippuris vulgaris* from a ditch on the right-hand side of the road between Kynnersley and "Butterey" [Buttery Farm], about 3 km east of where Henry Bidwell (see 2.9) recorded this species from the ditches intersecting Crudgington Moor; *Utricularia vulgaris* agg. and *U. minor* from three sites each; *Mentha pulegium* from Rodington Heath in 1797 and from Evenwood Common east of Acton Burnell (both described by Leighton as "since inclosed"); *Trichophorum cespitosum* from "Heath above Silvington"; *Eleocharis acicularis* from Cole Mere, White Mere, Betton Upper Pool, Sundorne Pool and the River Roden at Rodington; *E. quinqueflora* from four or five localities around Bomere Pool and neighbouring pools and also from Mosterley (south of Cound); *Eleogiton fluitans* from four localities in these pools and neighbouring ditches and also from ditches near Ellesmere, Birch and Woodhouse (south-east of Whittington); *Cladium mariscus* from Cole Mere "in abundance" and from the same bog near Woodhouse (perhaps Rednal Moss); *Carex lasiocarpa*—for which records from Shropshire are attributed to Williams by Smith and by Turner and Dillwyn also—from near Eaton Mascott, Shomere and the Ellesmere area; and *C. diandra* from ditches in the Weald Moors near Edgmond and at the east end of Cole Mere and from the sides of Shomere and Hencott Pools.

Indeed, so comprehensive and reliable was Williams's manuscript list that Leighton, who only had an opportunity of consulting it when his own Flora "had proceeded nearly to completion", wrote that, if he had been "earlier apprised of the existence of this Catalogue, he would have deemed it incumbent upon him to have made it the basis" of his own work and that he considered it "a delightful duty to bear his humble testimony to Mr. Williams's uniform fidelity and accuracy" (Leighton 1841, p. vii). Unfortunately, very few of the entries are dated, but many must be first records for Shropshire and others relate to species long extinct, such as Roman nettle (*Urtica pilulifera*) and motherwort (*Leonurus cardiaca*). *Mercurialis annua*, from "Gardens in Frankwell, Shrewsbury", was rediscovered in the same area about a century and a half later. One more entry from the list deserves to be recorded, if only for its charm—*Dianthus deltoides* "Upon the lawn at Davenport House, near the dog-kennel"!

Thomas Purton (1768–1833) was born at Eudon Burnell near Bridgnorth. He became a surgeon and practised in London and Alcester, Warwickshire. He was especially interested in mycology and became a Fellow of the Linnean Society in 1821. His *Midland Flora* (Purton 1817 and 1821) contains some Shropshire records, including *Prunus domestica* ssp. *insititia* and *Taxus baccata* from his native parish, most appropriately in the latter case as Eudon means "Yew hill" (Ekwall 1960, p. 169).

2.6 The Botanist's Guide and its contributors

In 1805 **Dawson Turner** (1775–1858), a banker of Great Yarmouth, and Lewis Weston Dillwyn (1778–1855), a porcelain manufacturer, both of them Fellows of the Royal and Linnean Societies, published *The Botanist's Guide through England and Wales*, the first book to attempt a county-by-county enumeration of the rarer British plants. This includes Shropshire localities for 96 vascular and 11 lower plants. Turner himself provided records for six species, all from Coalbrookdale, including *Equisetum sylvaticum*, *Scirpus sylvaticus* and *Carex pendula*. Waring, Withering and Stokes are given as authorities for a few species, and Williams for seven vascular plants and two others; but his *Elatine hexandra* appears as *E. hydropiper*, as also in Smith and Sowerby (1802, Vol XIV, 955), Plymley (1803, pp. 193–194) and Smith (1804, Vol III, p. 1396)—an error first corrected by J E Bowman (see 2.7) in Hooker *et al* (1831, Vol I, 2670), though Smith (1824, Vol II, pp. 243–244) had previously suggested that the plant was not *E. hydropiper*, calling it *E. "tripetala"*. *Silene nutans* at

Hawkstone is attributed to the Revd **William Wood** BD FLS (1745–1808), a Nonconformist Minister who succeeded Joseph Priestley at Mill Hill Chapel, Leeds, in 1773, and *Sparganium "natans"* (probably *S. minimum*) in "ditches upon a large bog" south-east of Oswestry to "Mr. Griffith", presumably **John Wynne Griffith** FLS (1763–1834) of Garn, near Denbigh, who is acknowledged by Withering (1796) and discovered *Cotoneaster integerrimus* on the Great Orme and *Saxifraga cespitosa* and *S. rosacea* in Cwm Idwal (Clarke 1900). Turner and Dillwyn's principal sources of records for Shropshire will be discussed later.

Arthur Aikin (1773–1854) was born at Warrington and in 1784 moved to Great Yarmouth, where his father was a doctor and where he presumably met Turner. He was trained for the Unitarian Ministry but changed his plans and turned to chemistry and mineralogy. He became Secretary of the Geological Society, which he helped to found in 1807, and later of the Society of Arts; he was elected FLS in 1818. As a young man he walked in July and August 1796 through Shropshire and North Wales with his younger brother and another companion and recorded, among other plants, *Erodium moschatum* near Montford Bridge; "blackberries uncommonly large and well flavoured" along "the sheltered lane from the village to the quarries" at Nescliff; *Parnassia palustris* and *Osmunda regalis* on Knockin Heath; and on Llanymynech Hill plants "such as are always found to denote the presence of calcareous earth", notably *Anthyllis vulneraria, Helianthemum nummularium* and *Rosa pimpinellifolia* (Aikin 1797).

Other interesting plants reported by Aikin are recorded by Turner and Dillwyn (1805) in their *Botanist's Guide*; these include *Cochlearia danica* from "Castle Walls, Shrewsbury, plentifully"; *Saxifraga hypnoides* from Titterstone Clee Hill; *Rumex maritimus* and *Luronium natans* from "Ancot Pool" [Hencott Pool, just north of Shrewsbury]; *Vaccinium vitis-idaea* and *Empetrum nigrum* on the Stiperstones (see 2.2); and *Utricularia minor* on Whixall Moss. Of *Vaccinium oxycoccos* he says "in almost all the low Shropshire bogs". Doubtful records are *Asplenium "lanceolatum"* from "Hagmon hill" (probably an error for *A. trichomanes*, which Williams recorded from Haughmond Hill); *Subularia aquatica* from "Ancot Pool"; and *Orobanche elatior* from Hope Bowdler (probably *O. minor*). All but one of these records are repeated by Hewett Cottrell Watson in *The New Botanist's Guide* (1835), but either attributed simply to "*B.G.*" (*Botanist's Guide*) or more precisely localised with another botanist's name given, for example "N. side of Titterstone Clee Hill, just below the great basaltic column. *E. Lees, sp.*" (see 2.7) for *Saxifraga hypnoides*. Most are also given by Leighton (1841), but only *Rumex maritimus* and *Orobanche elatior* are attributed to Aikin. Leighton also attributed to Aikin records of *Rubus saxatilis* on the Stiperstones and of *Monotropa hypopitys* in woods between Coalbrookdale and Coalport (only two specimens) and quoted him as saying that *Oxalis corniculata* was "abundant near the Welsh Bridge" when he first knew Shrewsbury "but after 3 or 4 years disappeared".

Aikin supplied Turner and Dillwyn with records from two other botanists, "but unfortunately in such a manner" that they "were not able to separate their respective communications" (Turner and Dillwyn 1805, p. 510). **John Evans**, in whose name all the records stand, "graduated M.D. at Edinburgh 1778, and was physician to the Salop Infirmary from 1782 to 1814" (Carter 1960). He inherited his father's estate at Llwyn-y-groes near Llanymynech in 1795; Aikin and his companions dined with him there on 25 July 1796 after crossing Knockin Heath (see above), so he may have acted as guide to the party when they visited Llanymynech Hill in the afternoon. The other botanist was **Joseph Babington** (1768–1826). He took his BA degree at Cambridge in 1791 and his MB at Oxford in 1795, after which he practised as a physician at Ludlow. Later he was ordained and became Rector of Broughton Gifford in Wiltshire before retiring to Bath in 1822 (Babington 1897).

In fact, it is not difficult to determine in most cases whether a record in Turner and Dillwyn's *Guide* was really Babington's, as he had two years previously published a list of "Some of the more scarce or curious plants of this part of the country" in the Archdeacon of Salop, the Venerable Joseph Plymley's (1803) *General View of the Agriculture of Shropshire* (pp. 188–207). This follows four pages (184–187) of well-informed discussion of some 24 grasses, mainly from an agricultural point of view but including *Melica uniflora*, as mentioned by Leighton (1841). The list provides localities for, and in many cases comments on, 72 other flowering plants, eight ferns, one clubmoss (*Lycopodium clavatum* "On Bedston-hill") and 30 lichens found in Shropshire, principally around Ludlow. Records listed also by Turner and Dillwyn include *Botrychium lunaria* "In a meadow near to Ludlow"; *Ceterach officinarum* "on some walls at Ludlow, where it flourishes very much"; *Gymnocarpium dryopteris* "On the side of the Titterstone Clee-hill, near its summit; and at Downton Castle, by the side of the walk on the left hand side of the river, leading up to the mill"; *Viola lutea* "scattered, rather sparingly, over the upper parts of the Titterstone Clee-hill"; *Dianthus plumarius*—as *D. caryophyllus*, but see Leighton (1841, p. 188)—on the walls of Ludlow Castle and some other old walls near Ludlow; *Geranium sanguineum* and *Potentilla tabernaemontani* near Downton Castle, near Ludlow; *Asperugo procumbens* ("Trailing catch-weed") with *Anchusa arvensis* "By the side of a road, near the junction of the river Corve with the river Teame"; and *Verbascum blattaria* and *V. virgatum* near the road to Shrewsbury, about five and 11 miles respectively from Ludlow. It is noteworthy that among the plants recorded in Littleton Brown's letter to Dillenius of 14 January 1726 (see 2.3) is "Blattaria lutea without ye walls of Ludlow Castle".

Two records attributed by Turner and Dillwyn to Aikin also appear in Babington's list—*Saxifraga* *hypnoides* on the summit of Titterstone Clee (see above) and *Scirpus sylvaticus* in a field near the Tenbury road about seven miles from Ludlow. Other notable records include *Aconitum napellus* "in an apparently wild state, in some places within a few miles of Ludlow"; *Luronium natans* "growing wild near to Tenbury"; and *Orchis ustulata* "On the side of the hill opposite to Downton Castle". Some of Babington's comments are of special interest today; for example he says of *Chamerion angustifolium* (see 2.4) "I never saw it growing wild in this county." By contrast, of *Centaurea cyanus* ("blue-bottles") he says "In corn-fields common" and of *Campanula patula* "though not frequently met with in most other counties, . . . a very common, and beautiful ornament of the hedges, and road-sides, in many places not far distant from Ludlow". He records *Colchicum autumnale* "in some places near to Caynham Court, and in a few other parts of this county" and calls it "a very troublesome weed, and very difficultly eradicated". He writes in more familiar terms of *Lamiastrum galeobdolon*: "It grows in almost every hedge, and is far from being deficient in point of beauty. In many other counties it is, I believe, not a common plant."

Among the records almost certainly correctly attributed to Evans by Turner and Dillwyn (1805) are those of *Geranium pyrenaicum* "Near the Quarry" (presumably in Shrewsbury); *G. rotundifolium* "Near Shrewsbury, plentifully"—almost certainly an error, as implied by Leighton (1841) on p. 333; *Chrysosplenium alternifolium* at "Longnor [Longner] near Attingham"; *Drosera "longifolia" (D. intermedia)* on "Bomere pool bog; and Hatton Nine [Hine] heath"; *Cymbalaria muralis* "On a wall at Oldport near Oswestry"; *Mentha pulegium* in "Wet fields near Llanymenech"; *Campanula patula* in five of the six localities attributed to Turner and Dillwyn by Leighton (1841); *Lobelia dortmanna* in Bomere Pool; *Damasonium alisma* in "Ellesmere mere"; *Epipactis palustris* (as "SERAPIAS *longifolia*") in "Llynygroes wood near Llanymenech" (but the record of the same species from "Oakley wood near Bishops Castle" may not be Evans's own; see also 2.2); and *Rhynchospora alba* at Bomere Pool. Again, many of the records attributed to Evans by Turner and Dillwyn (1805) reappear in Watson (1835) and Leighton (1841).

Withering's (1796) third edition of his *Arrangement* mentions both Aikin (wrongly, it seems, as "Reverend Arthur AIKIN") and "Dr. J. EVANS, *Physician at Shrewsbury*", but not Babington, in "*A List of the Names of those who have favoured this Edition with their Assistance*" (p. xi of Vol I); and a number of Shropshire records are attributed to them in Volumes II and III. On 5 November 1825 Aikin presented to the Linnean Society "a Specimen of the *Astrantia major* L., found by him in an apparently wild state in a wood which covers the N.E. side of Yeo-edge, a limestone hill, near Stokesay Castle" (*Transactions of the Linnean Society*, **15** (1827), 507). In a brief note dated 1 November 1841 and published in *The Phytologist*, Leighton stated that it was discovered here in 1840 by Daniel Sharpe "in plenty"; but William Borrer (1781–1862), who gathered specimens in July 1841 following Sharpe's directions, credited its discovery "as a wild plant in this country" to Aikin (Borrer *et al* 1865, 2990).

2.7 The beginning of the nineteenth century

John Jeudwine (1772–1835) was born in Canterbury, where he went to the King's School. He took his MA at St John's College, Cambridge, in 1797 and was Second Master of Shrewsbury School under Dr Samuel Butler (1774–1839), being appointed soon after him in 1798 and holding the post till his death. Despite their having been at St John's College together, "the two men were unable to work in harmony" and communications between them were "by means of letters of the most formal character" (Scott 1931). Jeudwine's principal claim to botanical fame is his discovery in about 1824 of *Scheuchzeria palustris* at Bomere Pool, in the moss on the west side, where apparently it had not been noticed by the Revd Edward Williams (Leighton 1841, pp. 156 and 519). He also found it, where Leighton knew it too, "on the adjoining Shomere moss" (Leighton 1866; Bennett 1898 and 1905; Lloyd 1940). The species was previously only known in Britain from Yorkshire.

William Anstice (1781–1850) was born at Bridgwater, the son of a merchant shipowner who was an active ornithologist and geologist, but he moved to Shropshire before he was 16 as an assistant to the industrialist William Reynolds (1758–1803), to whom and also to whose wife he was related. When Reynolds died, Anstice took over the management of the Madeley Wood ironworks and also inherited the substantial geological collections built up by Reynolds from at least 1776 (Randall 1880, pp. 173–174; Torrens 1982). Anstice himself became a notable geologist, subscribing in 1811 to Aikin's intended Mineralogical Survey of Shropshire and in 1836 becoming a Fellow of the Geological Society like his father (Torrens 1982); but his interest in botany does not seem to have been reported previously. A few years ago a copy of Vol II of Withering's (1796) *Arrangement*, inscribed "R Reynolds to W^{m} Anstice 1799", was acquired at a sale for the library of the Ironbridge Gorge Museum Trust, and this contains handwritten records of over fifty plants, mainly from the Madeley area. The donor was Richard Reynolds (1735–1816), "the famous Quaker philanthropist", William Reynolds's father and Anstice's great uncle (Shropshire County Library n d; Torrens 1982). Among the most interesting records are *Aquilegia vulgaris* "between Wood Bridge and Sutton Wood 1821"; *Papaver argemone* from "barley stubble adjoining Apley Terrace 1835"; *Sanguisorba officinalis* from "Cheshires Upper Meadow. Hedge nearest to Lee Dingle June 1835"; *Parnassia palustris* from "near Donington Glasshouse" (the glassworks in Wrockwardine Wood); *Chamerion angustifolium* from "banks of the Severn near the Rovings 1835"; *Hottonia palustris* "in 2 pits on the road to Leegomery" (in correction of Withering's own note on p. 237: "In a pit by the foot road from Wellington, in Shropsh. to Leegomery."); *Dipsacus pilosus* "by old coal pit in road to Madeley"; and *Paris quadrifolia* "in Limerock Wood & the Ercall, Shrop: WA", with a note saying "I have met with a plant with 5 leaves bearing no flower in Sepr. 1799." Records of *Silene nutans* from "Apley Terrace" and of "*Satyrium hircinum*" *(Himantoglossum hircinum)* from "Madeley Wood Salop. August 29" must be viewed with suspicion, the latter probably being an error for *Neottia nidus-avis*, which Gerarde (1597) called "*Satyrium abortiuum*".

John Freeman Milward Dovaston (1782–1854) was the son of John Dovaston (1740–1808) of the Nursery, West Felton, "a self-educated gentleman of great ingenuity, talent, and science, devotedly attached to planting and botany" (Leighton 1841, p. 497) who "after becoming interested in botany on a visit to the West Indies built up his ancestral seat as a highly prosperous tree-nursery" (Allen 1967). John Dovaston junior was educated at Oswestry Grammar School and at Shrewsbury School under Dr Samuel Butler, from which he went to Oxford, where he was known as "Crazy Jack of Christ Church". He took his MA and was called to the Bar in 1807, but soon after retired to his estate, where he carried out further planting, led an active public and social life, wrote poetry and took up ornithology and botany. In 1825 he published *Poems, legendary, incidental and humorous* under the title of "Poet-Ferneat of the Breiddens" (Carter 1960). He was a close friend of Thomas Bewick (1753–1828) and provided much material for, as well as actually drafting the preface of, the sixth edition (1826) of his *A History of British Birds*; he also proved that robins "have their own beats" and invented an "Ornithotrophe", the earliest-known feeding-device for wild birds, as well as using nest-boxes, an "Ornithoscope" or spy-glass, which could be "instantly and silently drawn out to three distinct foci", and neck-rings to prove that migrating swallows returned to the same place to nest (Allen 1967).

Another of J F M Dovaston's friends was William Leighton (see 2.8), for whose Flora (Leighton 1841) he provided a few records, most of them of no special interest, and for whose *A Guide through the Town of Shrewsbury*, published anonymously in 1836 with new editions in 1845 and 1850, he provided a list of local birds. In Leighton's Flora an account by Dovaston is given on pp. 497–498 of his father's planting about sixty years previously a pendulous yew "bought off a poor cobbler for sixpence, who had plucked it up from a hedge-bank near Sutton"; from its berries, carried on one branch of an otherwise wholly male tree, the younger Dovaston raised 17 progeny and gave these to various friends whom he lists, including Leighton himself. Leighton named this variety of *Taxus baccata "Dovastoniana"* after the elder Dovaston. J F M Dovaston also experimented with germinating mistletoe (Dovaston 1839; Leighton 1841, p. 492), succeeding on 23 sorts of trees including "the Oak, several Pines, Cherry, Laurel, Holly, Lime, Elms, Hornbeam, Birch, Sycamore, Ash, Chestnut, Hazel, Acacia, and its own friends the Crab, Apple, Hawthorn and Pear . . . but on all, except on its usual foster-nurses [it] 'sickened and so died.' " It is interesting that mistletoe may still be seen from the A5, growing on a tree of *Robinia pseudacacia* in the grounds of the Nursery. Dovaston's sites for *Viscum album* in the wild include Loton Park, on hawthorn; "Fettis farm, Melverley", on hazel; "Calcott hall, near Vyrniew", on "American Poplar"; and between Dovaston and Kynaston, on an old rowan tree in a hedge (Leighton 1841, p. 491).

George Jorden (1783–1871) was born at Farlow, between Ludlow and Bridgnorth, and served as a butler in Bewdley, where he died (Hamilton *et al* 1908; Amphlett and Rea 1909, p. xxiv; Jones 1980, p. 72). He "possessed an extraordinary knowledge of the plants of Wyre Forest" and "was the first botanist to recognize the two forms of British Thymes" (Amphlett and Rea 1909); he also "discriminated" the supposedly truly native form of *Chamerion angustifolium*—var. *macrocarpum* Syme (at one time called *Epilobium macrocarpum*), with shorter stolons and longer seed capsules (Hamilton *et al* 1908). In July 1854 Jorden, whom Edwin Lees (see later in this section) affectionately dubbed "The Custos of Wyre" (Jones 1980, p. 72), is reputed to have "discovered a single plant of *Spiranthes aestivalis* at the great bog on the Worcestershire side of the Forest" (Gissing 1855; Lees 1867, p.v; Amphlett and Rea 1909, p. xxiv). Lees (1867) gives on p. 6 a list of over a hundred "plants of Wyre Forest and the vicinity of Bewdley" provided by Jorden, including 15 microspecies of *Rubus*. This includes *C. angustifolium* var. *macrocarpum* at Bridewell. Some of the records also appear in Leighton (1841) and Jorden's (1856) account of the local botany.

Among the species listed are a number confined (or nearly so) in our region to Wyre Forest—*Equisetum hyemale; Thalictrum minus* (which Leighton attributes to Lees from near Buttonoak but which has not been seen since); *Gnaphalium sylvaticum; Cephalanthera longifolia* (which Leighton quotes Lees as reporting "most abundantly where a recent fall of wood has taken place or on the borders of the old rides"); and *Melica nutans* (of which Leighton mentions a specimen of Lees's from the Shropshire part of the Forest). Other species in this list for which Wyre Forest is a major stronghold are *Geranium sylvaticum* and *G. sanguineum* (for both of which Leighton gives "Dowle Wood, plentiful" on Jorden's authority); *Scutellaria minor; Convallaria majalis; Eriophorum latifolium;* and *Carex pallescens*.

Jorden also recorded four introduced species—*Lunaria annua* and *Nicotiana rustica* "naturalized about Bewdley" and growing "in considerable profusion"; *Spiraea salicifolia* "on the banks of Dowles Brook, naturalized"; and *Anaphalis margaritacea* "in a copse near Park Farm" (Lees 1867, pp. 6–8). The last was communicated by the Revd T Butt to Sir James Edward Smith (1759–1828) and recorded by him in his *English Flora* (Smith 1825, Vol III, p. 413; Leighton 1841, p. 408). The famous sorb-tree, *Sorbus domestica*, of the Wyre Forest was mentioned as already an old tree in 1678 by Alderman Pitts of Worcester and was subsequently "celebrated in botanical works as the only apparently wild tree of the species in Britain" (Lees 1867, p. 4); Jorden (1862) recorded its destruction by fire, and the history of its descendants is given by Jones (1980, pp. 72–78).

Other interesting records in Jorden's list include *Lycopodium clavatum* at Winterdyne; *Botrychium lunaria* on Warshill; *Juniperus communis* in Furnace and Sturt's Coppice; *Astragalus glycyphyllos; Sanguisorba officinalis*; six roses including *Rosa pimpinellifolia, R. tomentosa, R. "villosa"* and *R. rubiginosa; Hippuris vulgaris* at Uncless; *Pimpinella major* and *Pyrola media* (both now apparently extinct in our region); *P. minor; Monotropa hypopitys* on Warshill; *Gentianella campestris* at Trimpley; *Myosotis sylvatica* at Bridewell; *Pedicularis palustris* in Furnace Coppice; *Orobanche "major"* (probably *O. rapum-genistae*) on Warshill; *Mentha pulegium; Acinos arvensis* on Warshill; *Campanula patula; Ornithogalum umbellatum; O. nutans* and *Allium oleraceum* (two species that Leighton does not include in his Flora); *Epipactis palustris; Neottia nidus-avis;* and *Carex "fulva" (C. hostiana)*. From references in Leighton (1841) it seems that some species in the list were found at or near Oreton, 3½ miles north of Cleobury Mortimer—*Hyoscyamus niger* "near Pensax" and "plentiful" near Oreton; *Erigeron acer* ("plentiful"); *Chamaemelum nobile* ("common"); *Narthecium ossifragum* at "Leigh-head [Lye Head], Rock Parish, in a wood", "Catherton Marshes and Oreton"; *Spiranthes spiralis* near Detton; and *Coeloglossum viride*. Leighton also quotes Jorden as recording *Teucrium chamaedrys* at Oreton, "nearly destroyed by quarrying for limestone", implying a habitat other than an old wall. Among 16 other species from Oreton attributed to Jorden by Leighton are *Rhamnus catharticus* ("not common"); *Anagallis tenella* ("common"); *Gentianella amarella* ("Oreton limequarries, plentiful"); *Pinguicula vulgaris* ("Oreton Common, plentiful"); *Nepeta cataria; Marrubium vulgare*; and *Anacamptis pyramidalis*.

John Eddowes Bowman (1785–1841), an "able field botanist of national reputation", was born at Nantwich and became a banker at Wrexham; from 1837 he lived in New Stretford Road, Manchester (Allen and Lousley 1979). He was elected FLS in 1828. On 29 July 1836 he discovered, for the first time in Britain, *Cuscuta epilinum* parasitising a field of flax near Crose Mere (Leighton 1841, p. 125), though he was not "aware of its being *new*" at the time; when he "visited the spot the following season", he "saw not a specimen" (Allen and Lousley 1979), but he found the species again in August 1839 at "Trelydan Hall, near Welsh Pool, Montgomeryshire" (Hooker *et al* 1843, Vol III, 2850). Watson (1835) and Leighton (1841) attribute other records from the North Shropshire Meres and Mosses to him and/or to the Revd **Andrew Bloxam** MA (1801–1878); the overlaps suggest that they botanised together in the 1830s, and Watson actually conflates them as "*J. E. Bloxam*" for a record of *Kickxia elatine* in a cornfield near West Felton! Bloxam was born at Rugby and was educated at Rugby School and Worcester College, Oxford; he was then appointed naturalist on board *HMS The Blonde* in 1824 and visited South America and various islands in the Pacific including the Sandwich Islands, on the natural history of which he published some notes. After ordination he held various curacies and livings in Leicestershire and Warwickshire, where most of his botanising was done. His special interest among flowering plants was in the genera *Rubus* and *Rosa* (Bagnall 1891, pp. 501–502).

Among the more interesting plants recorded from the Meres and Mosses are *Elatine hexandra* from the mere at Ellesmere "between the House of Industry and Otley [Oteley] Park"; *Astragalus glycyphyllos* from the canal bank near Ellesmere; *Drosera anglica* and *D. intermedia* from Whixall Moss (Bowman); *Myriophyllum alterniflorum* "in a pond by the side of the Canal near Whixall Moss . . . and near Colemere" (Bloxham)—for the first time clearly recognised in Britain as a distinct species (Clarke 1900); *Littorella uniflora* from the mere at Ellesmere "below Otley"; *Lobelia dortmanna* from the end of Blake Mere (Bloxam); *Cirsium dissectum* from Ellesmere and a boggy field by the canal a little beyond Blake Mere (Bowman); *Luronium natans* from the mere at Ellesmere "below the House of Industry" (Bloxam); *Damasonium alisma* at Ellesmere, described in Watson (1835) as "very rare there" (though occurring also in "most of the Shropshire Meres") but in Leighton (1841) as abundant in the mere and adjoining ditches and canal; *Potamogeton gramineus* from a wet ditch near Cole Mere (Bloxam); *Eleocharis acicularis* from the same area as *Elatine hexandra; Rhynchospora alba* from Whixall Moss (Bowman) and a bog near Ellesmere (Bloxam); *Cladium mariscus* from the south-west margin of Crose Mere (Bowman); *Carex lasiocarpa* from Cole Mere and Blake Mere; *C. diandra* from Cole Mere and the mere at Ellesmere (Bowman); *C. elongata* from Cole Mere "below the point where the Ellesmere Canal leaves the direction of the mere" (Bowman); and *Calamagrostis canescens* from the northern margin of Crose Mere and from Cole Mere (Bowman). Bloxam also recorded *Cardamine impatiens* from Tinker's Hill near Ludlow; *Camelina sativa* from cornfields at Hoard's Park near Bridgnorth; and *Pyrola minor* from woods near Ludlow.

The Revd **Thomas Salwey** (1791–1877) was born at Ludlow, where his parents lived at The Lodge. He was educated at Eton College and at St John's College, Cambridge, of which he was a Fellow from 1817 till 1828, though for many years non-resident owing to ill-health and living at Berrington. He took his MA in

1818 and his BD in 1826 and was elected FLS in 1824. He was Vicar of Oswestry from 1823 to 1872 and died at Worthing five years later. His principal botanical interest was in lichens, and Leighton (1841, p. x) links his name with those of Dovaston and Bowman as "his valued friends". William Borrer named after him the lichen *Lecidea salweii*, which Salwey discovered "about the year 1825, in the Breiddin Mountain, Montgomeryshire," and subsequently elsewhere (Hooker *et al* 1843, Vol III, 2861).

Among the plants attributed to Salwey by Leighton (p. 504) is what is almost certainly the earliest Shropshire record of *Veronica persica*—a species first found in the British Isles in 1825 (Clarke 1900)—in a cornfield at Penyllan near Oswestry; he also recorded *Viola lutea* from Pentregaer a little to the west. His own published paper on the species of the parish of Oswestry (Salwey 1855) contains 47 flowering plants and ten ferns and fern allies, besides longer lists of lichens and fungi and a few mosses and algae. Notable records are *Hymenophyllum wilsonii* "Upon a rock in a wood at Treflach"; *Phegopteris connectilis* at Craigforda; *Cystopteris fragilis* ("*Cystea dentata*") "On the loose heap of stones below the Tower at Pentregaer; also upon a high wall, at the back of the house, at Broom Hall"; *Hornungia petraea* (a species not listed by Leighton) at Pentregaer and Trefonen and "upon the slope of the hills facing Llansilin"; *Arabis hirsuta* at Pentregaer (but Leighton says "Blodwel rocks" and that he had seen Salwey's specimen); *Parnassia palustris* in meadows between Sweeney and Morton and "in a field on the west side of the Brick-kilns, at the High Vawr" (but Leighton says at Maesbury, in addition to mentioning the brick-kilns); *Gentianella campestris* as well as *G. amarella* on the Moelydd (referred to as Trefonen by Leighton); *Atropa belladonna* at Porthywaen (a locality not given by Leighton); and *Crepis paludosa* in meadows at Maesbury (whence Leighton saw a specimen). Salwey described *Ranunculus parviflorus* as "Not uncommon on hedge banks", mentioning a site on the Maesbury road, "near the Gallows-Tree Bank". A few of his records used by Leighton (1841) are from other parts of Shropshire, for example those of *Hypericum montanum* from above Wolverton on Wenlock Edge and *Pyrola minor* from Whitcliffe Wood near Ludlow and from a "coppice below Delbury [Diddlebury] common" south of Wenlock Edge.

The Revd **Waties Corbett** (or Corbet) (1796–1855) was born and died at Longnor; he was the son of Archdeacon Joseph Plymley (see 2.6), who assumed the name and arms of Corbet in 1804. He was admitted to Trinity College, Cambridge, in 1814, becoming BA in 1821 and MA in 1824. Corbett was Rector of Coreley from 1821 to 1835, Perpetual Curate of Leebotwood with Longnor from 1822 till his death, and Rector of Acton Scott from 1833 also till 1855; he became Prebendary of Hereford in 1836 and Chancellor of the Diocese the next year (*The Clergy List for 1841*; Venn 1944). Among Corbett's more interesting records reported by Leighton are those of *Viola lutea* from "Caer Caradoc and the Brown and Titterstone Clee Hills"; *Hypericum elodes* from Titterstone Clee; *Dianthus armeria* from a canal bank in the parish of Burford, "once only"; *Geranium sylvaticum* in woods at Mawley, near Cleobury Mortimer; *Wahlenbergia hederacea* from Titterstone Clee (where it still occurs); *Legousia hybrida* (now extinct) from "Dry corn-fields near to Nash Court, in the parish of Burford"; *Lobelia dortmanna* (also extinct) from "Shallow pools on the Longmynd"; *Senecio fluviatilis* "In a watery lane in the hamlet of Hintz, in the Parish of Coreley"; and, among eight orchids from the parish of Coreley and elsewhere, *Orchis ustulata* from "Pasture field near the Sallow Coppice, near Millechop [Millichope], parish of Eaton".

The Revd **Spencer Perceval Mansel** (1797–1862) was born at Chesterton near Cambridge, where his father became Master of Trinity College before being made Bishop of Bristol. He was a godson of Spencer Perceval, who became Prime Minister. He went to Eton College and then his father's college at Cambridge, taking his BA in 1819 and MA in 1822. Leighton (1841, p. x) describes him as of Church Stretton, but in 1841 he was Curate of Barnham, Suffolk, and from 1845 to 1849 Minister of Bayston Hill, after living at East Sheen, Surrey (Venn 1951). He is not mentioned in *The Clergy List* from 1850 onwards. Leighton attributes a few records to him, including *Hypericum elodes* from "Clun Dale, Longmynd", and *Dianthus deltoides* from "Plantation, World's End, Church Stretton".

Contributors to Leighton's Flora from outside Shropshire included **William Groves Perry** (1796–1863), a Warwick bookseller and Curator of the Warwickshire Museum (where his herbarium still is), who recorded species in the Wyre Forest, and the Revd **William Robert Crotch** MA (1799–1877), a Fellow of New College, Oxford, who became a master at Taunton Grammar School and in 1872 Vicar of Catherington in Hampshire (Foster 1888); his records include *Polemonium caeruleum* "On banks of the Woofe [Worfe], near Bridgnorth" and *Echium vulgare*, *Campanula patula* and *Anacamptis pyramidalis* "About the High Rock near Bridgnorth".

Edwin Lees (1800–1887) was born at Worcester. He lost his father at an early age and, after attending a private school in Birmingham as a boarder for a few years, was apprenticed to the printing trade. He studied to educate himself and escaped into the country whenever he could. He used to visit family friends near the Wrekin, where perhaps his love of botany began. By his late twenties he was able to set up his own business as a master printer and bookseller, and in 1828 he wrote (under a pseudonym) and published *The Stranger's Guide to the City and Cathedral of Worcester*, including a catalogue of the local flora. He was a founder member of the Worcestershire Natural History Society in 1833 and became the first Honorary Curator of its Museum. He was elected FLS in 1835 and soon afterwards retired to Forthampton Cottage near Tewkesbury, from which he made numerous botanical excursions. With two friends he founded the Worcestershire Naturalists' Club in 1847, and in 1867 it published his Flora, *The Botany of Worcestershire* (see earlier in this section); by this time he had moved back to Worcester, where he spent the rest of his life as a very active Senior Vice-President both of the Worcestershire Naturalists' Club and of the Malvern Field Club (Jones 1980).

Leighton (1841) attributes records to Lees mainly from the vicinity of the Wrekin and from Wyre Forest. Lees recorded, for example, "very large and tall trees" of *Ilex aquifolium* "on the northern flank of the Wrekin Hill" (see 2.5); *Anagallis tenella* and *Pinguicula vulgaris* in a bog at its base on the north-east side; and *Geum rivale* "between Wellington and the Lime-quarries, below the Limekiln woods". Most of the records from Wyre Forest duplicate or expand those of Jorden, and indeed Lees himself (1867, p. 6), referring to Jorden's list, wrote: "Many of these, but not all, have been confirmed by Mr. W. Matthews and myself."

Thomas Bodenham (1804–1873) lived at Hookagate three miles south-west of Shrewsbury, then in Column Buildings, Shrewsbury, and subsequently at a larger house, Sunfield. A short account of him is given by Forrest (1899, pp. 20–21), who says he was "of a very retiring disposition" and latterly "a chronic invalid". He became a close friend of William Beckwith (see 2.11) and built up a fine collection of specimens of birds taken in Shropshire. He was a prominent member of Swan Hill Congregational Church.

Bodenham was for a time a member of the Botanical Society of London, founded in 1836, and from about 1838 till 1843 acted as its Local Secretary for Shrewsbury; he had been elected a Fellow of the Botanical Society of Edinburgh by 1847 (D E Allen, pers comm, 17 December 1980). Among about forty records from Welbatch, near Hookagate, attributed to him by Leighton (1841), some supported by herbarium specimens, are *Ranunculus sardous; R. parviflorus; Saxifraga granulata* ("tolerably common"); *Galeopsis angustifolia; Colchicum autumnale; Orchis morio* and *O. mascula* (both also from Lythwood nearby); and *Lolium temulentum*. Among his other records are *Blackstonia perfoliata* from fields at Lythwood and *Eleocharis quinqueflora* from "South base of Broom Hill, near Pulverbatch".

George Lloyd (1804–1889) was born at Albrighton, near Shifnal, probably at Neach Hill; his family certainly lived there in about 1832, when Mrs Elizabeth Reynolds of The Copse, Birmingham, paid a visit and botanised with him and admired his herbarium, which is now at Kew, though there are also many specimens of his in Warwickshire County Museum (Allen and Lousley 1979). He took his MD degree at Edinburgh in 1826 and subsequently lived at Leamington, but never practised, being, like Bodenham, "of ample means". Lloyd collected plants from 1825 to 1843 with Sir William Jackson Hooker (1785–1865) and George Arnott Walker Arnott (1799–1868), authors of *The British Flora* (Desmond 1977). From Neach Hill itself he recorded *Arabis glabra* and *Hypericum humifusum*. Among other Shropshire records credited to Lloyd by Leighton (1841) are *Atropa belladonna* from Lilleshall Abbey; *Acinos arvensis* from "Rushley wood" (probably Ruckley Wood, south-east of Shifnal); and *Inula conyza* from Chesterton, five miles north-east of Bridgnorth. In a letter dated April 1833 Elizabeth Reynolds mentioned having "the pleasure of gathering" all these species while staying at Neach Hill, probably the previous summer—the first certainly and the other two presumably in these stations (Allen and Lousley 1979).

More shadowy figures acknowledged by Leighton are **Thomas Du Gard** Esq MD FGS (1777–1840) of Shrewsbury, **R G Higgins** Esq of Newport, the late **W W Watkins** Esq of Shotton, and **T W Wilson** Esq MD, "formerly of Shrewsbury" (Leighton 1841, p. x). Among the few notable plants reported by Dr Du Gard were *Erodium moschatum* from near Lilleshall and *Gnaphalium sylvaticum* from "Red lake, Ketley". Higgins's contributions were more significant and included *Helleborus viridis* from a field adjoining Lilleshall Abbey; *Stellaria nemorum* (now possibly extinct) from the same abbey; *Vaccinium oxycoccos* from "Pilson [Puleston] Common in the parish of Chetwynd"; *Pedicularis palustris* from Little Hales, between Lilleshall and Woodcote; *Verbena officinalis* from "Under Lilleshall church-yard wall"; *Inula conyza* from Lilleshall Abbey; *Baldellia ranunculoides* from a pool "by the side of the Canal [now abandoned] between Church Aston and Lilleshall and in the ditch in the Duke of Sutherland's private road leading to Kinnersley [Kynnersley]"; and *Narcissus pseudonarcissus* "Abundantly in a meadow at Woodseaves near Market Drayton". Watkins's discoveries include *Pedicularis palustris* from Fenemere, near Baschurch, and *Orchis morio* from Shotton, near Harmerhill, where he lived. Dr Wilson's records include *Arabis glabra* from near Shotton; *Verbascum blattaria* from near Wem; and *Eleogiton fluitans* from the side of a pit near Astley—the last a find shared with Edward Elsmere (see 2.9), suggesting that Wilson knew him. The herbarium in Shrewsbury Museum contains specimens attributed to "Doctor Wilson".

2.8 The famous four

The years 1805–1809 saw the birth in Shropshire of four men who were to become famous—or in one case (fundamentalists might say two) infamous! The Revd **William Allport Leighton** (1805–1889) was the author of the first Flora for Shropshire (1841), already quoted many times in this chapter and regarded by his contemporaries as "the best county flora that had appeared" (Hamilton *et al* 1908). The Revd Canon **Thomas Butler** (1806–1886) was the only son of Dr Samuel Butler, Headmaster of Shrewsbury School (see 2.7), and father of Samuel Butler (1835–1902), the novelist, "and thus the model of the appalling Theobald Pontifex in that masterpiece of autobiographical fiction, *The* *way of all flesh*" (Allen 1979). **Charles Cardale Babington** (1808–1895) was the son of the Revd Joseph Babington (see 2.6) and became Regius Professor of Botany at Cambridge in 1861. **Charles Robert Darwin** (1809–1882), the fifth of the six children of the Shrewsbury doctor Robert Waring Darwin (see 2.5), is of course the best-known of the four men; but, though there is evidence of his fishing for newts, collecting insects, birds' eggs and minerals, keeping a diary of birds and examining geological sections in Shropshire during his school and university years (Darwin 1887; Oswald 1982) and of his inoculating Thomas Butler, during an undergraduate reading party at Barmouth in 1828, with "a taste for botany" which lasted all his life (letter from Thomas Butler to Francis Darwin, 13 September 1882, quoted by Allen 1979), no record seems to have survived of his botanising in his native county after his earliest attempts "to make out the names of plants" (Darwin 1887, Vol I, p. 28).

William Allport Leighton was the only son of William Leighton, keeper of the Talbot Hotel in Shrewsbury, and Lucy Maria, daughter and co-heiress of John Allport of Prescot. He attended a small school in Claremont Hill run by a Unitarian Minister, the Revd G Case, with Charles Darwin before going on to Wolverhampton Grammar School. In 1822 he was articled to a solicitor in Shrewsbury, but after the death of his father he matriculated in 1829 at St John's College, Cambridge, just after Butler went down and while Babington was still an undergraduate; Darwin had arrived at Christ's College the previous year after abandoning his medical training at Edinburgh. At Cambridge, like Babington and Darwin, he was profoundly influenced by the Revd John Stevens Henslow (1796–1861), the Regius Professor of Botany and a Fellow of St John's College, and, on his return to Shrewsbury after taking his BA in 1833, he postponed ordination till 1843 in order to devote his energies to compiling his Flora, which he dedicated to Henslow. This was arranged in accordance with the sexual system of Linnaeus, making it inconvenient to use today. It provided carefully composed descriptions of all the 876 species (flowering plants only) included, as well as localities, with etchings of diagnostic features of some difficult genera by Leighton's own hand, "not inserted as *embellishments*" but with "attempted accuracy".

Even before its appearance in 1841, Leighton had published an article in Loudon's *Magazine of Natural History* in 1835 and written *A Guide through the Town of Shrewsbury* anonymously in 1836, including a list of "the rarer species of plants indigenous to the vicinity". The former, describing "*Viola imberbis*" (i.e. beardless violet), first noticed on "the Sharpstones Hill" near Shrewsbury in 1833, as possibly a new species, gives this locality also for several other species which are also listed by Watson (1835); these include *Ranunculus parviflorus, Teesdalia nudicaulis* and *Dianthus deltoides*. The list in the Guide includes *Diplotaxis tenuifolia* (in the second and third editions only) from the ruins of Shrewsbury Abbey; *Cochlearia danica* from the walls of the Dominican Friary in Shrewsbury (see 2.6: Arthur Aikin; 2.11: W E Beckwith); *Vicia sylvatica* and *Chrysosplenium alternifolium* from Shelton; *Saxifraga granulata* from "near Harwood's boat-house"; *Smyrnium olusatrum* from the mound of Shrewsbury Castle; *Lobelia dortmanna* from Bomere and Berrington Pools; *Convallaria majalis* from Pimhill, north of Shrewsbury; and *Colchicum autumnale* from "fields near Dorset's barn" and from Sutton. By this time (1836) Leighton had decided that the violet from "Sharpstones Hill", Sutton Spa and Nobold was "*Viola suavis*, (Bieberstein)", "a native of the orchards of the Ukraine, and in hedge-rows about Charkow", apparently "a species intermediate between Viola hirta and V. odorata" and "new to the British Flora"; but in his Flora (1841, pp. 116 and 514) he relegated it to the level of a variety "*imberbis*" of *V. odorata* differing from Bieberstein's *V. suavis*.

The Flora contains Leighton's own localities—mainly around Shrewsbury—for most species, in addition to those attributed to other botanists; so it is difficult to select records of special significance other than in cases where Leighton distinguished taxa for the first time in Britain. Thus, he seems to have been the first British author to reduce "*Spergula vulgaris*, Bönningh." to varietal rank (Leighton 1841, pp. 199 and 522); his records of *Callitriche platycarpa* "Near Preston Gobald churchyard; near Oaks Hall near Pontesbury; Sharpstones Hill near Shrewsbury" (p. 446) are regarded by Clarke (1900) as the first for the British Isles; he and "Mr. C. A. Stevens of Rochester" seem to have distinguished *Scrophularia auriculata* from *S. umbrosa* ("*S. Ehrharti*, Stev.") at about the same time in 1839, though Leighton never observed the latter species in Shropshire (pp. 300–301); and his Flora sets out (pp. 434–435) Babington's characterisation of "*Epipactis latifolia*" and "*E. viridiflora*" (the latter, which was found by Leighton and Babington "in 1835 in the woods on the west side of Bomere pool", probably being *E. leptochila*) and distinguishes (pp. 428–429) *Dactylorhiza incarnata* from other marsh-orchids (though giving no definite locality for it).

Leighton was Curate of St Giles' Church in Shrewsbury from 1846 till 1848, but then resigned to devote himself again to botany, this time principally to cryptogams and especially lichens, though he also pursued his interest in brambles. The first edition of his *A Guide through the Town of Shrewsbury* does not include any brambles, but the second (1845) contains records of eight taxa of *Rubus* (including "Rubus Leightoni") and the third (1850)—in which Leighton is for the first time revealed as author of the list of plants—27, including 11 from "Almond Park" (Alkmond Park, by the Baschurch road out of Shrewsbury), three from Haughmond Hill and two from Shawbury Heath. The second edition carries at the end enthusiastic reviews of Leighton's Flora, to which the reader of the plant list is also referred for "more ample details of the Botany of Shrewsbury and its vicinity". In 1851 the Ray Society published Leighton's *British species of angiocarpous lichens, elucidated by their sporidia*; and in 1871 he published privately *The Lichen-Flora of Great Britain, Ireland and the Channel Islands*, which reached a third edition in 1879. He was elected FLS in 1865. Five species of lichens and fungi are named after Leighton. His herbarium is at Kew, but there are also numerous specimens of vascular plants from it in Shrewsbury Museum.

Charles Cardale Babington was born in Ludlow, 3½ years after Leighton, was at Charterhouse from 1821 to 1823 and went up to St John's College from a private school in Bath in October 1826, taking his BA in 1830 and his MA in 1833 and eventually becoming a Fellow of the College in 1882. He was one of the founders of the Entomological Society in London in 1833 and became known as "Beetles Babington" (Venn 1940). He was elected FLS in 1830, Fellow of the Geological Society in 1835, Fellow of the Botanical Society of Edinburgh in 1836, FRS in 1851 and Fellow of the Society of Antiquaries in 1859, and he was an active member of the British Association for the Advancement of Science and the Cambrian Archaeological Association. His publications included *Manual of British Botany* (1843, with a tenth edition revised by A J Willmott in 1922), *Flora of Cambridgeshire* (1860) and *British Rubi* (1869). Babington became Professor of Botany after his mentor Henslow's death in 1861 and held the Chair till his own death at Cambridge 34 years later. He bequeathed his herbarium of nearly 50,000 sheets, including many plants collected in Shropshire, and his library to the University of Cambridge.

Babington's (1897) Journal provides brief information about his numerous visits to Shropshire, when he often stayed with Leighton at his house, Luciefelde, regarded at that time as "near to Shrewsbury". On 4 August 1832—not 1831, as stated by Leighton (1841, p. 156)—they walked to Bomere Pool and found the *Epipactis* species mentioned earlier "and *Scheuchzeria palustris* in seed" (see 2.7: John Jeudwine; and also Babington 1833). Two days later they "met Lewis, of St. John's College, who went with us to ascend the Breidden mountain", where, "amongst some rocks near the beginning of the ascent", they found "a single specimen of *Potentilla rupestris* in seed". Two days later again, they walked along the canal to Uffington, finding among other things *Hydrocharis morsus-ranae*, then climbed Haughmond Hill, seeing *Anagallis tenella* and *Scutellaria minor*, and finally visited Haughmond Abbey, finding *Dianthus plumarius* on its walls. They found *Scheuchzeria palustris* again on 9 July 1834, with "*Carex limosa, C. teretiuscula* [*C. diandra*], *C. curta*, etc.", and three days later they went "by the Pool [Welshpool] coach to the Breidden", leaving Shrewsbury "at half-past five a.m.", and found "*Hieracium alpinum* [later described by Babington (1837) as probably a new species and in fact the first discovery in Britain of *H. peleteranum*], *Sedum Forsterianum*, and *Potentilla rupestris* in seed on a crag at the top of the nearer end of the precipice". Next day, a Sunday, they went "to church at Meole" (perhaps to hear Thomas Butler preach?) and on the Monday "to Nescliffe Hill", where they met J F M Dovaston, with whom they later dined at West Felton and admired the "very curious *Yew* tree in his garden" (see 2.7). On 14 September 1835 they again went to Bomere Pool "and saw plenty of *Scheuchzeria palustris* in leaf, *Utricularia minor*, etc." and on 10 August 1847 they were there again "and found *Scheuchzeria palustris* in the old place". Meanwhile, in June 1843 they had walked "about five-and-a-quarter miles from Shrewsbury, on the road to Pontesford", to see the trees of *Salix* × *meyerana* discovered by Leighton "at Hanwood" in June 1836 (Borrer *et al* 1863, 2961–2962), and to "Almond Park", where they saw "*Rubus fissus*".

On 30 September 1854 Babington botanised in the Wyre Forest with "W. Mathews, jun., [of] Edgbaston House" and they were joined by "Lees, and a Mr. Thompson, and Mr. Jordan [*sic*]" (see 2.7); he commented: "Forest all low wood. Full of *Rubi*." In August 1856 he was at Welshpool for a meeting of the Cambrian Archaeological Association. He recorded *Agrimonia procera*—a species first recognised in the British Isles four years previously (Borrer *et al* 1864, 2982; Babington 1897, p. 165; Clarke 1900)—"close to Glan Hafren . . . in a damp situation" and "near the Gaer in the lane by Trefnanney [Trefnannau, five miles north of Welshpool]" and *Epilobium palustre* and *E. obscurum* by the canal north of Welshpool; he also commented that he had "not seen *E. tetragonum* in this district". On 13 August 1863 he was at a well-attended meeting of the Caradoc Field Club at Church Stretton and remarked: "The day was very hot, and we did little more than ascend Caer Caradoc." Next day he found "*Rubus fissus* and *R. suberectus*, also *Agrimonia odorata* [*A. procera*]" in "the marshy ground, below a quarry, on the right-hand of the lane leading to Berwick" from Shrewsbury.

Thomas Butler was born in Shrewsbury, where he went to his father's school and where he returned after graduating at St John's College, Cambridge, in 1829 as Seventh Classic; after ordination the same year and until 1834 he combined a post as an Assistant Master under his father with the Curacy of the nearby village of Meole Brace. There seems to be no record of his botanising in Shropshire at this period and he is not acknowledged by Leighton (1841). He then became Rector of Langar-cum-Barnston in Nottinghamshire and later also Rural Dean of Bingham and Canon of Lincoln. His botanical activities and membership of the Botanical Society of London in the 1840s and 1850s are mentioned by Allen (1979). In 1876 he retired to Wilderhope House in the Belle Vue district of Shrewsbury, "where he identified himself with the life of the town, and took up the care of the botanical section of the museum" (letter from his granddaughter quoted by Garnett 1926, p. 14), to whose herbarium he "contributed a large number of plants", becoming its "honorary curator" (Hamilton *et al* 1908).

Thomas Butler seems scarcely to have deserved the reputation of a monster bestowed on him by his elder son, Samuel. His tender, if doggerel, verses written to accompany posies for his wife when she was ill early in 1836 and 1839 ("Here's a China primrose As a balm for your woes." or "You see I have not been too lazy To pick my little wife a daisy."), his humorous letters to his grandchildren and their comments about him ("That kind old man" or "a second father to us, and very dearly beloved") all refute the idea that Butler possessed "that sluggish coldness of heart which is the most displeasing feature of Theobald Pontifex" (Garnett 1926, pp. 12–41). Nor does Samuel Butler's dismissive attitude to his father's botanical activities (Allen 1981) seem any fairer.

2.9 More contributors to the 1841 Flora

Edward Elsmere (1808–1878) was born at Alkmond Park near Shrewsbury (Leighton's favourite locality for *Rubi*) and lived from about 1822 till 1845 on his farm at Astley (Hamilton *et al* 1908). He seems to have been a competent botanist, providing Leighton with useful records from his home area, of Cyperaceae and Gramineae in particular, for example *Eriophorum latifolium* from Astley; *Trichophorum cespitosum* and *Eleocharis multicaulis* from Shawbury Heath; *Eleogiton fluitans* from the side of a pit near Astley; ten species of *Carex* from Astley and Hadnall, including *C. rostrata* and *C. vesicaria* from the former and *C. pallescens, C. ovalis* and *C. pulicaris* from the latter; *Lolium temulentum* from Hadnall; *Hordeum secalinum* from "Meadows near the New Park, Shrewsbury"; *Avena fatua* from Astley (the first record for Shropshire); and *Calamagrostis epigejos* from near Battlefield Church (Leighton 1841). Other interesting records attributed to Elsmere by Leighton are of *Ranunculus arvensis, Chenopodium polyspermum* and *Lathyrus montanus* from Astley; *Epilobium tetragonum* and *Pimpinella major* from Hadnall; *Silaum silaus, Pastinaca sativa, Euphorbia exigua, Blackstonia perfoliata, Valerianella dentata, Serratula tinctoria* and *Luronium natans* from Astley again; *Coeloglossum viride* and *Orchis morio* from Hadnall; and *Platanthera bifolia* from near "Aiksmore Coppice" at Astley. Elsmere's herbarium was presented to the Caradoc and Severn Valley Field Club in 1900.

William Penny Brookes (1809–1895) was born and spent most of his life at Much Wenlock. He became a Licentiate of the Society of Apothecaries in 1831 and returned to his home town to join and eventually take over the medical practice of his father, Dr William Brookes, becoming MRCS in 1870. He was soon deeply involved in public affairs: in 1841 he founded and became the first President of the Wenlock Agricultural Reading Society; he was a founding Director of the Wenlock Gas Company in 1856; and he was appointed Secretary to the Much Wenlock and Severn Junction Railway Company. But his most remarkable achievement was the establishment in 1850 of the Wenlock Olympian Society and the staging of annual Olympic Games from that date; he was later a leading member of the National Olympian Association, founded in 1865, and in contact with Olympic pioneers in Greece and elsewhere (Mullins 1982; Hamilton *et al* 1908).

Brookes found time for botany also in his busy life. He "obligingly" provided "a list of some of the most interesting of the flowering plants, growing in the vicinity of Much Wenlock, with their respective localities" for the appendix (p. 29) of Charles Hulbert's (1837) *The History and Description of the County of Salop*. Among the species included are *Helleborus foetidus* "In a coppice at Fairley [Farley]"; *Clematis vitalba* from "Harley church"; *Filipendula vulgaris* from "Coppices at Fairley"; *Parnassia palustris* in a field at Rowley, west of Much Wenlock; *Lathraea squamaria* "In a wood on Wenlock Edge, near the road from Presthope to Hughley"; *Pinguicula vulgaris* at Rowley; *Verbena officinalis* ("simplers' joy") at Harley; *Campanula glomerata* "In a lane leading from the Hill-top to Easthope" and *Legousia hybrida* in "Cornfields round Wenlock" (both now, it seems, extinct in Shropshire); *Cirsium eriophorum* ("friar's crown") in "Shadwell coppice, near Wenlock"; *Triglochin palustris* in the same place; and, among 13 species of orchids, *Neottia nidus-avis* in "Ash coppice, near Wenlock" and *Ophrys insectifera* in a field at Rowley "and on lime rocks at Fairley". All but two of these records are given also by Leighton (1841), who indicates in most cases that he had seen a specimen and sometimes gives fuller details of localities; for *Filipendula vulgaris* he gives the locality as "Gleeton hill [Gleedon Hill], near Homer" and for *Legousia hybrida* he says: "In a corn-field near the Windmill, Wenlock, not common; W. P. Brookes, Esq." Other interesting records attributed to Brookes by Leighton include *Thalictrum flavum* from the bank of the Severn opposite Buildwas; *Hypericum montanum* from Standhill Coppice (of which Shadwell, already mentioned, formed a part); *Potentilla argentea* from "Beaumont hill [Bowmanshill], Quatford"; *Sium latifolium* from "Pool's dam, Wenlock Abbey"; *Lonicera xylosteum* from Coalbrookdale; and *Carex dioica* from a field at Rowley. The list of flowering plants given by Hulbert (1837) has five "of the fern tribe" appended, including *Botrychium lunaria* from "Homer common, near Wenlock". Brookes's herbarium, which lacks localities for the specimens, is now at Much Wenlock Museum, but there are also many specimens of his, with localities, in the herbarium at Shrewsbury Museum.

Thomas Campbell Eyton FLS FZS (1809–1880) was born and died at Eyton Hall, north of Wellington. He took up the study of natural history at an early age, publishing important ornithological books in 1836 and 1838 and in the latter year a paper entitled "An Attempt to ascertain the Fauna of Shropshire and North Wales" in a new journal, *Magazine of Zoology and Botany*. Among his naturalist friends was

Charles Darwin. When he inherited the family estate in 1855, he built at Eyton a museum to house his "marvellous collection of skins and skeletons of Birds from all parts of the world", which formed the basis of his major work, *Osteologia Avium*, published between 1871 and 1878 (Forrest 1899, pp. 21–22). Leighton attributes various plant records to Eyton, then living at Donnerville House, nearer Wellington, including *Trollius europaeus* in its most south-easterly locality in Shropshire, in a meadow near Walford; *Arabis glabra* near Marton, north-east of Baschurch; *Descurainia sophia* from Ness; *Hypericum elodes* in three localities—one still extant—in the Ruyton area; *Drosera intermedia* and *Andromeda polifolia* from a moss near Cold Hatton; *Myrica gale* from a moss at Walford and "Yestalls" [? The Yesters] nearby; and *Paris quadrifolia* from "The Pell wood, Totterton". Some of Eyton's herbarium specimens are in Shrewsbury Museum.

Henry Bidwell MD (1816–1868) was born and died at Albrighton, between Shifnal and Wolverhampton. He lived at Wellington and was Local Secretary of the Botanical Society of London and a Fellow of the Botanical Society of Edinburgh. His herbarium is now at the University of Oxford, but Shropshire specimens of his are also in the herbaria of the National Museum of Wales and Warwickshire Museum (D E Allen, pers comm, 13 January 1984). Among the more interesting of his records published by Leighton are those for *Radiola linoides* from Rudge Heath and *Cephalanthera longifolia* from a plantation near Ruckley (both now probably extinct in Shropshire); *Ceratophyllum demersum, Myriophyllum verticillatum* and *Hippuris vulgaris* from ditches on Sidney and Crudgington Moors, part of the Weald Moors north of Wellington; *Carex pallescens* from near Kynnersley in the same area; and *C. pulicaris* from Caynton, north-west of Newport. Bennett (1898) recorded that a specimen of Bidwell's of *Damasonium alisma* gathered at Ellesmere Mere (see 2.7) in 1843 was then "in the British Museum Herbarium".

Francis Dickinson (1816–1901) was born at Dale House, Coalbrookdale, the fifth son of a Yorkshire Quaker, Barnard Dickinson, who settled in Shropshire. He lived successively in Birmingham, at Buildwas Abbey and at Callaughton, near Much Wenlock, before buying a house at Crockham Hill near Edenbridge in Kent in 1857, where he died (*Shrewsbury Chronicle*, 1 November 1901; Hamilton *et al* 1908). Leighton's records ascribed to Dickinson include *Utricularia vulgaris* agg. from Hencott Pool; *Valerianella dentata* from cornfields near Little Wenlock; *Eleocharis acicularis* from White Mere; *E. quinqueflora* from a bog below the Wrekin, on its south-west side; *Carex extensa* from Whixall Moss (a very doubtful record for this coastal species); *C. limosa* from the bog below the Weeping Cross turnpike on the edge of Shrewsbury (as also recorded previously by the Revd Edward Williams; see also 9.3); and *C. lasiocarpa* from Betton Pool.

Harriet Moseley (*fl* 1830s–1860s) was the daughter of Walter Michael Moseley of Buildwas Park and later lived at Malvern. She contributed records not only to Leighton's Flora but also to Edwin Lees's *The Botany of the Malvern Hills* (1843, p. 31) and *The Botany of Worcestershire* (1867, p. xc) (see 2.7). The British Museum (Natural History) has her herbarium specimens and "unrivalled collection of original drawings of British plants from her own delicate and accurate pencil" (Lees 1867; Hamilton *et al* 1908; Desmond 1977). Her records in Leighton's Flora contain ten orchids, all from Buildwas: the list includes *Spiranthes spiralis, Neottia nidus-avis, Coeloglossum viride, Platanthera chlorantha, P. bifolia, Ophrys apifera* and *Anacamptis pyramidalis*.

2.10 Plant recording in the Ludlow area in the nineteenth century

The History and Antiquities of the Town of Ludlow (Wright 1822 and 1826) contains an unreliable list of plants found in the neighbourhood "together with the native GRASSES growing in this district". This includes what must be (*if* it is correct) the first record for v c 40 of *Erigeron canadensis* ("Canada Flea-bane. On the road to Caynham"); Leighton (1841) does not include this species at all, but he does report Salwey (see 2.7) as finding *E. acer* on old walls at Ludlow. The record of *Asperugo procumbens* from Turner and Dillwyn (1805) is repeated (see 2.6). Toothwort (*Lathraea squamaria*) at Caynham Camp appears—by an intriguing example of 'backwards translation'—as "Dentaria bulbifera", and what may be *Teucrium chamaedrys* is given, without any locality, as "Ajuga chamaepitys, Germander". "Xanthium strumarium, Lesser Burdock" is presumably *Arctium minus*. The grasses include both species of *Melica*. A similar alphabetical list can be found, without localities or entries for T, U, V and X, in *A brief historical sketch of Ludlow Castle*, published anonymously in 1835.

Leighton's Flora contains many records from the Ludlow area, including some of his own but most of them credited either to **Henry Spare** (whom he pointedly calls "Mr.") or to **Miss McGhie**, both described by him (pp. ix-x) as "of Ludlow". Nothing further seems to be known of either, except that over 80 of Spare's records are from Oakley [Oakly] Park, Bromfield, and three from Priors Halton Farm nearby; possibly he worked there; if he had been a landowner or gentleman of leisure, Leighton would surely have designated him "Esq.", a title he used even for Edwin Lees but not for George Jorden, W G Perry or Edward Elsmere! Mr Spare's and Miss McGhie's records appear to be completely independent, and they may never have met. Miss McGhie recorded only four plants from Oakly Park—*Lathraea squamaria* (and also from Caynham Camp; see above) and three sedges, none of which were reported by Spare; indeed there is not a single *Carex* among his records. If either Ludlow botanist had a herbarium, Leighton saw none of their specimens, whereas he records seeing material collected by **Joseph Sugar Baly** (1817–1890)—mainly of fairly common species—from Ludlow and elsewhere in southern Shropshire; this included a variety of *Dianthus plumarius* with white flowers from "Ludford church-yard wall". Some of Baly's herbarium sheets from Shropshire and eight other counties are in Warwickshire Museum (D E Allen, pers comm, 13 January 1984), and Shrewsbury Museum has some Shropshire specimens.

Among Spare's finds in Oakly Park are seven species for which Leighton gives no other Shropshire localities and which are presumably first records for v c 40—*Cerastium arvense, Anchusa officinalis* (a garden escape), *Potamogeton lucens* (possibly now extinct in Shropshire), *Apera spica-venti* (perhaps only a casual), *Catabrosa aquatica, Sesleria albicans* (probably incorrectly identified) and *Phalaris canariensis*. His record of *Picris echioides* from Stanton Lacy is also the only one given by Leighton. Other notable records from Oakly Park are of *Thalictrum flavum, Oxalis corniculata* (second record for v c 40; see 2.6: Arthur Aikin), *Sanguisorba officinalis, Myriophyllum spicatum, Salvia pratensis* (at first doubted by Leighton and certainly not now a Shropshire plant), *Campanula patula, Scabiosa columbaria, Anthemis arvensis, Cladium mariscus, Vulpia myuros, Glyceria maxima* (regarded as "not very common" by Leighton and only given five localities by him), *Hordeum secalinum* and *Alopecurus myosuroides*. Spare's list contains 13 grasses in all; does a knowledge of them but not of sedges suggest that he was a farmer? He also recorded eight orchids from Oakly Park—all of them, including *Gymnadenia conopsea* and *Orchis morio*, quite common in his day; from Priors Halton *Spiranthes spiralis* and *Ophrys sphegodes* (probably in error for *O. apifera*); and from Whitcliffe *Neottia nidus-avis*, as well as *Vicia orobus, V. lathyroides* and *Pyrola rotundifolia*.

Miss McGhie's records include *Juniperus communis* in woods at Burford and Ashford Carbonel and near Ludlow; *Helleborus foetidus* and *H. viridis* at "Clee Hill [Cleehill], near Bitterley"; *Ranunculus sardous* between "Ashford Village" and Saltmoor; *Cardamine impatiens* at Cleehill; *Descurainia sophia* (thought extinct till 1984) around Ludlow; *Hypericum montanum* at Ashford, Ludford and Steventon; *H. elodes* near Ludlow; *Dianthus armeria* (no longer occurring in the north-west Midlands) "On the hill towards Cleobury"; *Stellaria nemorum* (now possibly extinct) "In a hedge or thicket rather near to the Boiling well, beyond Lynney, towards Burway; and in a field near the Paper Mills, Ludlow"; *Geranium sylvaticum* at Cleehill; *Lathyrus sylvestris* at Ludlow; *Potentilla tabernaemontani* from four localities around Ludlow; *Daphne mezereum* at Cleehill (presumably a garden escape); *Myriophyllum verticillatum* in a canal near Ludlow; *Pimpinella major* on "Castle walk, Ludlow"; *Torilis nodosa* and *Datura stramonium* near Ludlow; *Misopates orontium* "About Ludlow" (Leighton's only entry for this species); *Galeopsis angustifolia* at Bromfield; *Campanula glomerata* (now apparently extinct in Shropshire) on the banks of the Corve at Bromfield; *Gnaphalium sylvaticum* around Ludlow; *Ornithogalum umbellatum* from Whitcliffe, Brook House [?Middleton] orchard and Ashford; *Iris foetidissima* "On a warm bank near Shortwood, in the neighbourhood of Ludlow"; *Spiranthes spiralis* at Caynham Camp; and *Lolium temulentum* near Ludlow. From further afield she reported *Erodium maritimum* (now probably extinct) "At the foot of the Longmont [Long Mynd]" (whence Leighton records that he saw a specimen) and *Stratiotes aloides* in Lilleshall Pond (the only site for this species given by Leighton).

In comparison with Spare's and Miss McGhie's, **Frederick Westcott's** (1843) list of 177 flowering and 46 lower plants observed in the neighbourhood of Ludlow in October 1842 makes uninspiring reading. From the tone of his covering letter to the Editor of *The Phytologist*, written from Spring Street, Edgbaston, on 3 December 1842, it seems that he was unaware of Leighton's Flora published the previous year and of the activities of "persons in the neighbourhood" who, he hoped, might be "induced to pay more attention to the Botany of their district"! Westcott was joint editor from 1837 to 1840 of *Floral Cabinet and Magazine of Exotic Botany* and became an Associate of the Linnean Society in 1841; he died in 1861 (Desmond 1977). Among his more interesting records are those of *Diplotaxis tenuifolia, Dianthus plumarius, Geranium lucidum* and *Sedum dasyphyllum* on the walls of Ludlow Castle and surrounding rocks (all already recorded in Leighton's Flora, two of them as seen by the author himself); *Calamintha sylvatica* ssp. *ascendens* (as "*Melissa Calamintha*") on the "banks of the castle walk, near Mortimer's tower" (also recorded from near Ludlow by Leighton); *Pyrola media* in "Whitcliffe coppice" (the first record for v c 40); and *Saxifraga hypnoides* "on the stones of that part of the Clee hills called the Hoar edge, abundant" (see 2.6). Westcott's list does not, as stated by Carter (1960), record any ferns, but, in another contribution to *The Phytologist* published later in 1843, he claimed to have found *Adiantum capillus-veneris* about 16 years previously on Titterstone Clee "among the stones, on the ascent to the group of rocks called the Giant's Chair". He could not refind this species and had probably recorded it in error for *Cryptogramma crispa* (which still grows on this hill in its only site in v c 40).

Alfred Marston (1835–1896), a Ludlow chemist, wrote a geological guide to the area around the town, which was published in 1865 in *Handbook to Ludlow*. This mentioned a few ferns (including *Cryptogramma crispa*) and was republished in 1870 and 1882 as the second half of Marston's *A guide to the ferns, and many of the rarer plants, growing round Ludlow*. In the preface to this later booklet he says: "The study of Ferns has now become such a favourite subject, (especially among the Ladies,) that I think a short guide . . . may not be unacceptable . . . "; he also explains that he has included "several of the rarer

Plants, kindly furnished me by a friend, well acquainted with the subject". Hints for cultivation are given for most of the ferns (see also 9.3). In all, 23 ferns are listed. Of *Cystopteris fragilis* he wrote: "occurring in few places in this district, the most abundant locality is in the beautiful Downton Castle grounds, . . . ; it is also to be found on Whitcliffe . . . and rarely in Maryknoll woods"; he described it as "manageable" in cultivation "and growing readily in pots or on rock-work". He said that the only locality for *Osmunda regalis* near Ludlow was "on the Clee Hills", but that it grew "abundantly near Shawbury". Marston listed 35 flowering plants (one twice!), including six orchids. *Astrantia major* (see 2.6) is described as "very elegant" and "found at the top of View Edge, in the wood. Very rare."; *Geranium sylvaticum* as "scattered through most of the woods near Ludlow"; and *Butomus umbellatus* as occurring on "the edge of the River beneath the Whitcliffe; it seldom flowers here." *Dianthus armeria* is reported "Near Greet and Ashford". "A singular plant, said to be parasitic on Clover," with "a dense spike of flowers of a dusty purple colour; found near the Lodge, in a dry lane" (clearly a species of *Orobanche*) is identified as *Bartsia alpina*! *Atropa belladonna* from Richard's Castle, *Wahlenbergia hederacea* from "marshy ground between the Titterstone and Hoar Edge" (see 2.7: Waties Corbett) and additionally (as "*Campanula Hederacea*") from "Near the foot of the Clee Hill", and *Paris quadrifolia* from "the Whitcliffe woods, and near Brick House [north of Bringewood Chase]" are presumably reliable records.

The most exciting botanical discovery in the Ludlow area was made in 1876 by a Miss Lloyd, who "found a specimen" of the ghost orchid (*Epipogium aphyllum*) in "The Wood" [Bringewood Chase] near Ludlow. This species was found again in the same wood in 1878 by a Miss Peele, and both specimens were carefully compared with the figure and description in *English Botany* (Syme 1869, Vol 9, Fig. 1486 and p. 131) by "Miss Lewis, of Ludlow" (Beckwith 1882, p. 367). The finds were the subject of a dispute between Professor C C Babington (see 2.8) and William Phillips and William Beckwith (see 2.11); the first two published short notes in *The Journal of Botany* (Babington 1881 and 1883; Phillips 1883), but it was finally established that the site in "a strictly preserved wood, at about a mile and a half to the north" [actually rather more, and to the west] of Ludlow was not in Herefordshire (as originally stated by Babington) but "in Shropshire, very near the borders of the county". In an unpublished letter to Beckwith of 12 January 1883, Babington says: "It was one of the Ladies, I do not know which, who gave me this information which I naturally considered as conclusive. But I have learned now that I was wrongly informed. It is of course of no moment to me in which of the counties the plant was found: geographically it is rather so. It probably grows in both counties as the woods are on the boundary line." This boundary line has since been changed; so the site is no longer in Shropshire, though still in v c 40!

2.11 Some botanists and local Floras of the second half of the nineteenth century

William Phillips (1822–1905) was born at Presteigne and joined his family's tailoring business in Shrewsbury at an early age. Though he had little formal education, he became an accomplished correspondent, studied classical and modern languages, and took up a series of hobbies—astronomy, botany (from the early 1860s), lichenology, mycology and antiquarianism—becoming a respected authority in each. He became a Fellow of the Linnean Society in 1875 and a Freeman of Shrewsbury in 1903. He lived latterly at Canonbury and was a close friend of his near neighbour, Leighton (Hamilton *et al* 1908; Carter 1960, pp. 179–181).

In 1877 and 1878 Phillips published two important contributions on the Shropshire flora—the first county list of pteridophytes and a list of flowering plants and ferns found within five miles of Shrewsbury, both with localities. Though the preface to the latter might be taken to imply that the author included records from Leighton's (1841) Flora only where the species still occurred, this unfortunately does not seem to be so; moreover, the number of new localities is not as great as might be hoped. One of the new ones, still extant, is "Banks of River Tern, Attingham Park", for *Saxifraga granulata*. Phillips's contributions to *The Journal of Botany* included short notes about *Cuscuta epithymum*, which he found "in a field near Burcott Gate in great luxuriance" in September 1870—probably the first record for v c 40 (1871); *Veronica persica* (as *V. Buxbaumii*), found by Phillips and Leighton at Upton Magna in April 1871 and thought to be "an importation of recent date", and *Galium album* (as *G. erectum*), "new to Shropshire, in a meadow forming part of the racecourse at Judas Butts, Shrewsbury" (1871); *Isoetes lacustris* at Bomere Pool, with *Lobelia dortmanna, Littorella uniflora* and *Elatine hexandra* (1874); *Botrychium lunaria* "between Preston Montford and the village of Ford" and "in Petton Park, . . . in considerable quantity" (1881); naturalised plants in Shropshire (*Chamerion angustifolium* and *Mimulus moschatus*) (1883); and *Montia perfoliata* at Grinshill (1894). Some of his herbarium specimens are in Shrewsbury Museum. Phillips also made a special study of the phenomenon known as the "breaking of the meres" (the proliferation of blue-green algae, likened "by the country people . . . to the aspect presented by the wort of beer in the act of fermentation") and published two papers on the subject, in 1884 and 1893. His mycological works included "The Hymenomycetes of Shropshire" (1880), "Truffles in Shropshire" (1883) and *A Manual of the British Discomycetes* (1887); and Volume I of the Victoria History (Hamilton *et al* 1908) contains his lists of fungi and lichens for the county (see 2.12).

Griffith Hooper Griffiths MD (*c* 1823–1872) was "Honorary Secretary of the Worcester Naturalists' Field Club" [*sic*] and may have lived for some years at Church Stretton (Dallman 1941). At any rate, he wrote a paper for the Woolhope Naturalists' Field

Club, "On the more rare plants of the Longmynds" (Griffiths 1871), based on a lecture given to it the previous year, and produced *A Botanical Guide to the Environs of Church Stretton* (Griffiths n d) at about the same time. Desmond (1977) describes him as "Muscologist and lichenologist": perhaps he was more reliable in his identification of mosses and lichens than the records from his botanical guide, included also by Benson (1904), suggest he was in the case of flowering plants and ferns! Among erroneous, or at least dubious, records are *Asperula cynanchica* from Ragleth and Chelmick, "abundant"; *Galium tricornutum* "In corn fields near Little Stretton"; *Viburnum lantana* from woods near Little Stretton; *Cirsium acaule* from the summits of the Lawley and Caer Caradoc; *Hypochaeris maculata* from Marshbrook; *Picris echioides* as "Common in corn fields round Church Stretton" (but he did not record any *Sonchus* species); *Potamogeton lucens* from Bomere Pool (never recorded before or since in this well-worked locality); *Groenlandia densa* from Longnor and Marshbrook; and *Pseudorchis albida* from Hope Bowdler. Phillips (1877/1878) casts doubt also on Griffiths's record of *Gymnocarpium robertianum* from Cheney Longville. It is to be hoped that some of his other records are more trustworthy, such as those of *Hippuris vulgaris* from near Darnford (near Ratlinghope); *Torilis nodosa* from roadsides and waste places at Church Stretton; *Legousia hybrida* from "Corn fields near Stretton"; *Filago germanica* from Marshbrook; *Serratula tinctoria* from Willstone Hill; and *Cichorium intybus* from "World's End. In a border of the field, found by Miss Wilson".

John Randall FGS (1810–1910) was not himself a botanist but "a celebrated china painter", a remarkable journalist and compiler of guide-books, and a proficient geologist. He was born in Broseley and died in Madeley just over a century later; the announcement of his death in *Shrewsbury Chronicle* of 18 November 1910 was headed: "Death of Shropshire's Grand Old Man" (Trinder 1975). Two of his guide-books, *Handbook to the Severn Valley Railway* (1863) and *The Tourist's Guide to Bridgnorth* (1875), contain lists of plants, with a common introduction. At the end of the list in the former, Randall "willingly" acknowledges the assistance of his friends "Messrs. Baugh, Jordin [*sic*], and [George] Maw". The list in the latter contains few localities.

Among the more proficient Salopian botanists of the generation after Leighton's was **William Edmund Beckwith** (1844–1892). He was the son of the Revd Henry Beckwith, Rector of Eaton Constantine, and was educated at Bridgnorth and King's College, London (Hamilton *et al* 1908). He returned to Eaton Constantine, where he lived till his father died in 1888, and was "most fortunate in having a great deal of leisure time, which he spent in the pursuit of his favourite study", natural history, and especially ornithology (Forrest 1899, pp. 18–19). Forrest says that "he never would sit for his photograph" but that he was "a very big man, and of a florid complexion, with brown hair, and light coloured eyes". He had many friends (see 2.7: Thomas Bodenham) and correspondents of all ages, and a number of botanical letters written to him survive. In 1889 he moved to Radbrook House, near Shrewsbury, where he died three years later (Forrest 1899, p. 20). Herbarium specimens of his are in the British Museum (Natural History) and National Museum of Wales (Kent and Allen 1984).

In 1876 Beckwith embarked on what amounted to a brief Flora of Shropshire, which was published in instalments in *The Journal of Botany* (Beckwith 1881 and 1882). In a short introduction he wrote of the "great changes . . . in the character of the soil" since Leighton wrote his Flora and commented that drainage had "either destroyed or circumscribed the limits of many of the bogs and pools", his "Golding Pool, near Pitchford", and the "boggy ground near Mosterley" having "long been drained"; nevertheless he had "often had great pleasure in finding plants still flourishing in localities instanced by him". Leighton himself wrote to him on 21 December 1882 to thank him for honouring him with a complimentary copy and, as "an old veteran", to say "Go on and prosper". Some time in the next ten years Beckwith compiled further notes on Shropshire plants of the families Ranunculaceae to Rosaceae, and, after his death, his daughter lent the manuscript to the committee then preparing a new Flora (see 2.12); W P Hamilton had this published in *The Journal of Botany* also (Beckwith 1901).

A younger botanical colleague of Beckwith's was **Robert Meyricke Serjeantson** (1861–1916), eldest son of the Revd William James Serjeantson, who was Curate of Titley in Herefordshire when Robert was born and from 1862 Rector of Acton Burnell. The child was evidently named after the Patron of that living, perhaps his godfather and/or uncle, the Revd Robert Meyricke of Ludlow (*Crockford's Clerical Directory* 1865). He went to Rossall School and thence to Keble College, Oxford, in 1880 to read History (Foster 1888 and 1893); but he was already a keen botanist before his seventeenth birthday, as he wrote to Beckwith on 7 September 1878 from Acton Burnell, reporting finding "Mentha piperita and the Lesser Skullcap" (*Scutellaria minor*) the previous day on Frodesley Hill nearby and *Hypericum humifusum* "at Church Preen, Frodesley Hill, & the Netherwood [Netherwood Coppice, between the last two places]". In January 1881 he was writing from Oldswinford, Stourbridge, to say that he had recently heard from Mr Phillips that a friend to whom he had sent a *Carex* found by Serjeantson and Beckwith at Ellesmere had "pronounced it to be C. Curta, but not a typical form"—the species Robert himself had made it out to be on his return home from Ellesmere. On 22 June of that year he reported a visit to Pitchford, where he had found "*lots* of Carex Strigosa . . . in a wet place beyond the pool farthest away from Pitchford", and on 19 October of the next year he wrote from Oxford confirming that he had "at home" a specimen of

Vaccinium vitis-idaea found "on the hill above the Mill glen" at Stretton, but saying that, as he "did not know that it was particularly rare", he "did not take much notice of it". Beckwith duly reported these and other good finds by his young friend in his notes in *The Journal of Botany*. Perhaps their best joint discovery was *Anagallis minima*, found in the autumn of 1882 "in the Shropshire part of Wyre Forest . . . growing in the damp parts of the drives, on which probably water has stood in the winter" (Serjeantson 1882), or "rather frequent in open places in Wyre Forest" (Beckwith 1882, p. 365). Earlier that year they also found *Potamogeton coloratus*, reported as *P. plantagineus* "(also new to this county) in a ditch near Crossmere [Crose Mere], Ellesmere" (Serjeantson 1882; see also Beckwith 1882, p. 366); this species is probably now extinct in the Shropshire Region. A letter of 12 March 1886 expresses Serjeantson's pleasure that a sedge he had found "lots of" on Frodesley Hill had turned out to be *Carex laevigata*, as he had "made it out to be" several years previously but "afterwards thought it could not be as it was not mentioned in Leighton".

By this time he had his BA, having gained second class honours in History in 1883, though he did not take his MA till 1892 (Foster 1893). In 1887 he was ordained Deacon at Peterborough and became Curate of St Sepulchre, Northampton, and in 1906 he was appointed Rector of St Peter's in the same town (*Crockford's* 1907). He wrote histories of various churches in Northampton and was joint editor of Volumes I and II of the Victoria History of Northamptonshire (1902 and 1906). He died at Acton Burnell at the age of 55 (Drennan 1970). Shrewsbury Museum's herbarium contains numerous specimens collected by him in Shropshire, many with localities and dates but without his name attached.

Apart from those already mentioned, some of the most noteworthy records in Beckwith's published papers are of *Nuphar pumila* "Frequent in Kettle Mere, near Ellesmere" (in fact discovered "growing abundantly in a mere near here [Ellesmere]" by Thomas Cox in 1854 (Cox 1855)); *Coronopus didymus*, first found in Shropshire by William Beacall (see 2.12) in the Castle Fields district of Shrewsbury; *Cochlearia danica* from "Old roofs near the Smithfield, Shrewsbury" (see 2.6: Arthur Aikin; 2.8: W A Leighton); *Elatine hexandra* from Bomere Pool (see 2.5: Edward Williams) and White Mere; *Montia perfoliata* "from Ryton, near Shifnal, where it is perfectly naturalized" (though it seems that the Revd J T Rooke had already recorded this species in the Shifnal area in 1867; see also Phillips (1894)); *Impatiens noli-tangere*, found by Serjeantson "apparently wild near Acton Burnell"; *Astragalus glycyphyllos* "On the High Rock, near Bridgnorth", from "Rindleford Bridge, below the mill", and from the "back of Birch Pool"; *Coronilla varia*, found with Serjeantson in the autumn of 1882 "on the banks of the Severn above Bewdley", but previously collected "from the same locality . . . by Dr. Fraser in 1874"; *Filipendula vulgaris* on "Bushy rough ground by Olympian field, Much Wenlock" (see 2.8: W P Brookes); *Sanguisorba officinalis* from "Meadows by small brook above Cruckton Hall", near Great Hanwood; *Hippuris vulgaris* "In a small pool near Tickwood, Ironbridge"; *Cuscuta epithymum* "on gorse on Charlton Hill and Tentree Hill"; *Verbascum lychnitis* "Near Snow Pool, Dryton, Wroxeter"; *V. blattaria* "Apparently quite wild near Leighton, Eyton-on-Severn, and Bettisfield" and "By the road from Cressage to Cound Moor"; *Limosella aquatica* "In a pool on Charlton Hill, Wroxeter" (the second record for this species in v c 40, following Leighton's (1841) from "Sandy muddy margins of river Servern at Shelton Rough, near Shrewsbury"); *Veronica persica*, found by Beckwith in 1877 near Eaton Constantine, but (in 1881) "never . . . since", but described in 1882 as "much more common within the last few years" and "now often plentiful in ploughed ground" (see 2.7: Thomas Salwey); *Salvia verbenaca* "Rather frequent about Bridgnorth; near Harnage, Cound", and "In several places near the Cross-houses, Berrington"; *Stachys annua*, established in a sandy field near Buildwas, first found in 1876; *Galeopsis angustifolia* (no longer found in v c 40) "Rather frequent about Much and Little Wenlock, and round the base of the Wrekin", and "Near Redhill, Shrewsbury; Presthope, and Kenley"; *Nepeta cataria* "by the road near Buildwas Bridge, and in the village of Presthope", and "on the ruins of Lilleshall Abbey"; *Campanula glomerata* "Frequent on Wenlock Edge, near Presthope Station"; *Cichorium intybus* "By the side of the Severn Valley Railway, between Shrewsbury and Berrington"; *Luronium natans* "abundant in the Shropshire Union Canal, near Colemere Mere, and Upton Magna" in 1880, and also in "Ellesmere, Whitemere, and Newton Meres" (now found in the canal but not in the meres); *Elodea canadensis* "Abundant in the Shropshire Union Canal, the Ellesmere Meres, and pools near Berrington, Acton Burnell, Leighton, Eaton Constantine, and Wroxeter", having "spread most remarkably through many parts of Shropshire", probably "transported by wildfowl, as it often occurs in small pools entirely fed by springs, and unconnected with any stream"; by contrast, *Scheuchzeria palustris* "On the mossy margin of Bomere Pool" (see 2.7: John Jeudwine), only "a few plants" found by Beckwith and "Mr. [the Revd J D] La Touche" in the summer of 1881, so feared to be "becoming scarce there"; *Potamogeton gramineus* (as *P. heterophyllus* Schreb.) "Frequent in Berrington Pool" (as recorded by Leighton (1841) in person); *Allium oleraceum* "By the road leading from Cressage to Cound Moor" (the first record for v c 40); *Crocus nudiflorus* "In the fields in the Quarry, Shrewsbury" (as reported by Phillips (1879) in *The Journal of Botany* as growing "under the lime trees on the margin of the public walk" but apparently "never . . . observed to flower"); *Orchis ustulata* "Rather frequent in some grass-fields under Wenlock Edge, near Harley"; *Acorus calamus* "in the pool at

Hawkstone" (the second record for v c 40, following that by Dr George Lloyd (see 2.7) in Tong Lodge lake); *Sparganium minimum* from a pool near Eaton Constantine; *Trichophorum cespitosum* "On Welshampton [Clarepool] Moss"; *Scirpus maritimus*, found by Beckwith in 1882" in several places in Hawkstone Pool" (first record for v c 40); *Blysmus compressus* (probably extinct in the region), "obtained" by Serjeantson "from Church Preen in 1878" (close to, if not exactly in, the spot described by the Revd Edward Williams (see 2.5) as in "a field at the bottom of Wenlock Edge, by the side of the road from Lutwyche to Kenley" (Leighton 1841, p. 507; see also Benson 1904) and probably also that elsewhere called by Beckwith "bog below Lushcott" and by William Beacall (see 2.12) in 1886 "Easthope Wood", as SO 5596 would fit all these descriptions); *Eleogiton fluitans*, found by Serjeantson on Shawbury Heath; and *Carex elongata* "near Whitemere Mere", found by Beckwith in 1880 (see also Phillips 1880) and identified by Professor Daniel Oliver of Kew—the second record for v c 40 (see 2.7: J E Bowman).

Thomas P Diamond (1839–1910) was born in Plymouth and apprenticed to a printer there. He moved to Hereford and, in 1871, to Oswestry to join the staff of *The Oswestry Advertizer*. He became Librarian of the Oswestry Free Library when it was opened in 1895 and was Honorary Secretary of the newly-founded Offa Field Club from 1889 to 1894 (Carter 1960, p. 181). In 1891 he produced *A Flora of Oswestry and District* including an English-Welsh glossary of plant names. This Flora was based on "a list of plants found during three years in the rambles of the Oswestry Institute (now the Offa) Field Club" and published in *The Oswestry Advertizer*, with "many additions ... made by the Rev. O. M. Feilden, Rector of Frankton, President of the Club, [see 2.12] who also kindly revised the list, and a few by other friends". With the further addition of records taken from *Transactions of the Oswestry and Welshpool Naturalists' Field Club*, the Revd Thomas Salwey's list (see 2.7), the Ellesmere Field Club's records and Leighton's Flora, a list of over 700 flowering plants and vascular cryptogams was produced. Diamond's herbarium, consulted by Carter at Oswestry Museum, seems since to have been lost or destroyed.

Among the most interesting records in the basic list are those of *Juniperus communis* from Carregybig and Craignant; *Ranunculus arvensis* from Llynclys; *Nuphar pumila* from "Blakemere, Colemere, &c."; *Sagina nodosa* from Crose Mere and Pant; *Geranium sylvaticum* from Sweeney; *Impatiens noli-tangere* from Frankton; *Trifolium scabrum* from Crose Mere; *Astragalus glycyphyllos* from Baschurch; *Rubus saxatilis* from Trefonen; *Parnassia palustris* from Treflach and Maesbury; *Smyrnium olusatrum* from Llynclys; *Empetrum nigrum* from Selattyn (see 2.4: Richard Waring); *Samolus valerandi* from Frankton; *Kickxia elatine* from Babbinswood; *Scrophularia vernalis* from Llanforda and Penyllan (see 2.3: Edward Lhwyd); *Mimulus "luteus"* (probably *M. guttatus*) from between Oswestry and Selattyn; *Utricularia vulgaris* agg. from Lyneal and Frankton; *U. minor* from Welshampton; *Salvia verbenaca* from Llanymynech; *Leonurus cardiaca* from Baschurch; *Marrubium vulgare* from Selattyn and Llanymynech; *Antennaria dioica* from Llanymynech Hill; *Scheuchzeria palustris* from Welshampton (Clarepool Moss), where it was discovered by the Revd O M Feilden in 1866 (see 2.12; Leighton 1866; Lloyd 1940); and *Paris quadrifolia* and *Rhynchospora alba*, both also from Welshampton.

Records of the Oswestry and Welshpool Naturalists include those of *Gymnocarpium robertianum* from Penyllan (see 2.3: Edward Lhwyd); *Sanguisorba officinalis* from Welshampton; *Saxifraga granulata* from Chirk; *Vaccinium vitis-idaea* from Llechrydau; *Sambucus ebulus* from Glyn Ceiriog; *Paris quadrifolia* from Llynclys and Ellesmere; *Listera cordata* from Craignant; and *Neottia nidus-avis* from Chirk. From Breidden (see 2.3) the list includes *Lychnis viscaria, Geranium sanguineum, Potentilla rupestris, Sedum telephium, S. forsteranum, Saxifraga hypnoides* (probably now extinct here as on Titterstone Clee), *Sison amomum* and *Veronica spicata* ssp. *hybrida*. Doubtful records are *Rubus chamaemorus* (see Chapter 4) from Selattyn and *Viburnum lantana* from Shelf Bank, Penyllan and Porthywaen.

2.12 An abortive Flora project

At the annual meeting of the Caradoc and Severn Valley Field Club on 11 February 1897 a committee was appointed "to take into consideration the production of a new Flora of Shropshire". It was natural that William Phillips, the Club's Referee for Botany for its annual *Record of Bare Facts* since its inception in 1891, should be Chairman of the committee. His nephew, W P Hamilton, was elected Honorary Secretary and Treasurer, and the other founder members were F R Armitage, William Beacall, R de G Benson, T P Blunt and the Revd W Hunt Painter. The committee's book of minutes and accounts has survived and shows that it was "resolved to deal with the Phanerogams first" and how the work of transcribing the species from Leighton's (1841) Flora was allocated. Special foolscap sheets were prepared, with headed sections for 13 botanical divisions based on the county's river basins.

In 1899 Armitage resigned from the Club, and the Revd O M Feilden and the Revd J A Panter were elected members of the committee. By October of the following year "Mr. Benson reported having added to sheets of Phanerogams all the reliable records to hand"; but, because of "the want of uniformity" in the way the sheets had been "written by different persons at the outset" and the fact that some of them were "crowded with unnecessary records", he "was deputed to reduce them to one plan and re-write them where necessary". He was only to attend one more meeting of the committee before his death in February 1904 after a "severe illness" lasting over a year, but during his last years he seems to have undertaken the major part of the work on the vascular plants, and it is mainly his revised species sheets that survive today. A meeting of the committee was held four days before Benson died, at which W B Allen was elected a member.

Little is known of Armitage or of Panter (who only attended one meeting of the committee, in January 1900), but a brief biographical account can be given of the other members of the committee (Carter 1960, pp. 182–185; Desmond 1977).

The Revd **William Hunt Painter** (1835–1910) was born in Birmingham and, after several curacies (none of them in Shropshire but the last at Biddulph in Staffordshire), became Rector of Stirchley in 1894, a position he held till the year before he died. He was referee for Botany for *Record of Bare Facts*. His Shropshire plant records sent to the Botanical Exchange Club included *Senecio squalidus* invading the south-west and south-east of the county in 1906. He also discovered a fumitory near Bishop's Castle in 1896, a fertile hybrid or possibly a new species not known outside Shropshire and not recently reported; H W Pugsley (1912, pp. 29–31) named it *Fumaria* × *painteri*. Painter's vast herbarium is in the Department of Botany at Aberystwyth. The Shrewsbury Museum herbarium also contains many plants collected by him. He was author of *A Contribution to the Flora of Derbyshire*, the first account of that county's flora, published in 1889.

William Beacall (1837–1905) succeeded his father and uncle as proprietor of an old-established Shrewsbury firm of curriers and was a Freeman and Justice of the Peace. His botanical interest was centred on flowering plants and he contributed numerous records for Shropshire. Phillips (1880) mentions the discovery by Beacall and Blunt of "a plentiful crop of *Datura Stramonium*, *Hyoscyamus niger*, and *Erysimum orientale*" (the last new to Shropshire) when foundations had been dug for one of the new masters' houses when Shrewsbury School moved to its present site. Beacall was also an archaeologist and friend of Beckwith and Phillips. He lived at Sunfield, where he died in the same month as Phillips, October 1905 (Hamilton *et al* 1908). The minute book suggests that he only attended one meeting of the Flora Committee, to elect W B Allen in 1904.

The Revd **Oswald Mosley Feilden** (1837–1924) was born in Herefordshire and educated at Christ Church, Oxford. He was Rector of Welsh Frankton for nearly sixty years, being known locally as "the Gilbert White of Shropshire", and became first President of the Offa Field Club in 1888 (see 2.11). The majority of his plant records were from the Ellesmere area, the most interesting being of *Scheuchzeria palustris* at Welshampton Moss (known today as Clarepool Moss) in 1866. In 1900 he published a list of plants of Whixall Moss. He seems to have been only a corresponding member of the Flora Committee, but in 1899 contributed "a long list of plants recorded chiefly by himself".

William Phillips Hamilton (*c* 1842–1910) of 2 Underdale Villas, Shrewsbury, "endeavoured to follow in the footsteps" of his uncle "and, like him, used all his energy in furthering the botanical knowledge of the county". He was Referee for Mosses and Hepatics for *Record of Bare Facts* and contributed a paper entitled "Shropshire Sphagna" to *The Journal of Botany* in 1902. Plants collected by him are now in the herbaria of the National Museum of Wales and Shrewsbury Museum.

Thomas Porter Blunt (1842–1929) was a graduate of Magdalen Hall, Oxford, where he gained first class honours in Natural Science in 1864 (Foster 1888; *Oxford Honours 1220–1894*). He became a chemist in Wyle Cop, Shrewsbury. He lived at Tower House, Shrewsbury, and became Curator of the Botanical Section of Shrewsbury Museum. He contributed a section on botany for *Church Stretton illustrated* by E S Cobbold (see overleaf), which ran to eight editions between 1903 and 1928. Garnett (1926, pp. 42–43) published a letter from him to Miss May Butler about her father, Thomas Butler (see 2.8).

Richard de Gylpyn Benson (1856–1904) was born at Pulverbatch and educated in Shrewsbury at a private school run by Dr Edward Calvert. He became a solicitor in London, but returned to his native village at the age of thirty because of poor health. He was specially interested in brambles (*Rubus* species) and in mosses, and he compiled a list of "226 species and 20 varieties", entitled "Shropshire Mosses", for *The Journal of Botany* in 1893 and a list of vascular plants for *A Flora of the Church Stretton District* (Benson 1904), which Hamilton edited after the author's death. Interesting records of Benson's in this include *Sagina nodosa* at Pulverbatch; *Althaea officinalis* at "Wimote, Corvedale" (presumably a casual if correct); *Mimulus "luteus"* (*M. guttatus*) by a pool near Longnor in 1893 (one of five records for the period 1891–1898); and *Nepeta cataria* at the railway bridge between Condover and Dorrington. Latterly he "could not walk without assistance" and "was always suffering great pain" (letter from his widow, Elizabeth Mary Benson, of 27 January 1908 to F M Ingram of Shrewsbury School Biology Department when donating mosses collected by him). Specimens of his are also in the National Museum of Wales (with mosses collected by eight other members of his family) and Shrewsbury Museum.

William Beriah Allen (1875–1922) was born at Benthall and became a potter. His "Notes on Shropshire Poplars" and "Notes on the botany of Tickwood and district" were published in the Field Club's *Transactions* in 1908. He was, however, principally a mycologist, and he was author of *The Mycetozoa of Shropshire*, published by the Shropshire Archaeological and Natural History Society in 1911 and recording 76 of the 146 species listed in A Lister's (1894) *Monograph of the Mycetozoa*. A L Smith named *Cudoniella allenii* after Allen.

In 1901 William Phillips was "approached with regard to an account of local botany for The Victoria

County Histories now in preparation" and "brought the subject before the committee". It was resolved that **Edgar Stirling Cobbold** DSc FGS (1851–1936) of Watling House, Church Stretton, be asked to write "a geographical description of the County Divisions . . . with geological details so far as they affect plant-distribution". Benson agreed "to write the general botanical account and prepare tabulated statements" and to collaborate with Painter on "the special groups *Rubus* and *Rosa*". Hamilton was to "take" the mosses, hepatics and algae, and Phillips himself the fungi and lichens. Later, Phillips received help from Allen with the fungi and took on the general introduction and the description of the 13 botanical divisions, though Cobbold contributed the geological notes. In the event, Benson and Phillips died before the work was completed, and Hamilton revised and expanded the lists compiled in 1902 and prepared the account for publication in 1908.

The Flora Committee did not meet between 17 January 1905 and 18 February 1909, but—two members, Phillips and Beacall, having died in October 1905—Hamilton sent a note to Allen, Painter and Blunt in February 1908 asking if they agreed to elect the Club's President, J Cosmo Melvill, as a member; all of them agreed, and Melvill succeeded Phillips as Chairman, with Hamilton remaining Secretary and Treasurer.

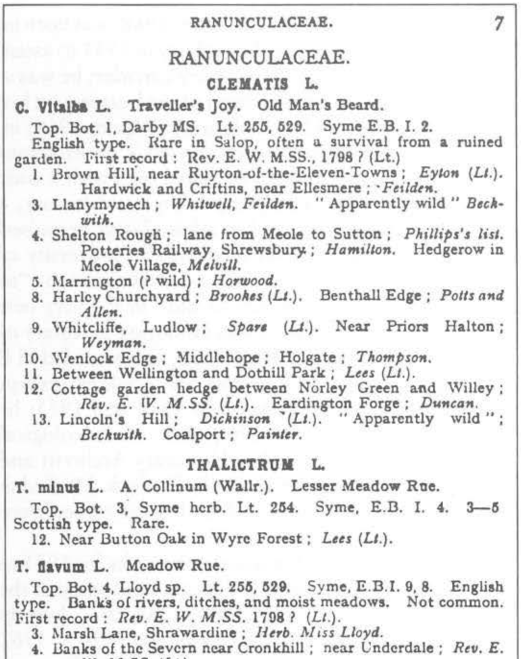
James Cosmo Melvill (1845–1929) was born at Hampstead and published *The Flora of Harrow* while still a boy at Harrow School in 1864. He was also interested in shells and in insects. After graduating at Trinity College, Cambridge, in 1868 he travelled widely and collected plants in Europe and North America. In 1878 he "read an account of three visits paid by him to the Breidden Hills, Montgomeryshire, North Wales, in May, June and July, 1877", published in 1879 in *Memoranda and Proceedings of the Manchester Literary and Philosophical Society*, of which he became President nearly twenty years later while Member of Parliament for South Salford. He became a Fellow of the Linnean Society in 1870 and a Doctor of Science at the University of Manchester in 1904. Melvill retired to Meole Brace Hall early in the century and was President of the Caradoc and Severn Valley Field Club from 1904 to 1914. He succeeded Painter as Referee for Botany. He built up what "must have been one of the largest private herbaria in the country", including collections by several other botanists, and housed it in "a special building in the garden" (Carter 1960; Desmond 1977). Melvill's contributions to *The Journal of Botany* included short notes on *Reynoutria japonica* (as *Polygonum cuspidatum*) at Church Stretton (1904), *Geranium endressii* "getting quite naturalized in the parish of Halford, Craven Arms" (1910) and four Shropshire aliens (1924). The last gives a further account of *G. endressii*, describes the discovery by Melvill and Allen of, among other aliens, *Torilis microcarpa* Bess. on ballast dumped on waste ground at Buildwas in 1910 (new to Great Britain), mentions *Cicerbita macrophylla* "known . . . in two places, very near to each other, not far from Shrewsbury", and reports George Potts's noticing *Rudbeckia amplexicaulis* Vahl. near "Benthall House, Broseley". Melvill recorded over a hundred plants from Badger Dingle in July 1914, including *Impatiens noli-tangere* and *Dipsacus pilosus* (Carter 1960). He is commemorated in the name *Habenaria melvillii* Ridley (Desmond 1977).

Although the committee did not meet for so long, Hamilton was able to report considerable progress with the Flora at the meeting in February 1909. He had "taken over the M.S. of the Flowering Plants from Mrs. [*sic*] R. de G. Benson about the end of the year 1906, revised it, brought the records and nomenclature up to date, and put it nearly ready for the press". Meanwhile, national experts "had kindly assisted with the Flora by reading over MS. sheets, looking at specimens, and making suggestions for corrections: The Rev. E. F. Linton, M.A., Willows and *Hieracia*; Dr C. E. Moss, Cambridge Museum, Oaks; Mr. H. W. Pugsley, *Fumaria*; the Rev. W. Moyle Rogers [of Bournemouth], the *Rubi*; and Mr. A. Bennett, F.L.S., almost the whole of the rest of the Flowering Plants—a very heavy task". It was resolved to present to the Club's annual meeting "a statement of the probable cost of the Flora (which had been prepared by the secretary)". At a meeting 12 days later, Hamilton was "authorized to produce a circular announcing the publication of the new Flora provided that the names of 275 to 300 subscribers be received". At this meeting Herbert Edward Forrest (1858–1942), author of *The Fauna of Shropshire* (1899) and *The Vertebrate Fauna of North Wales* (1907), was elected a member. All seemed set for a successful conclusion to 12 years' work, but at a third meeting only 11 days later, on 13 March 1909, "Mr. Hamilton, being about to leave the town and neighbourhood, resigned the post of Honorary Secretary". Possibly a terminal illness had been diagnosed. It was decided "not to issue the circular at present" in view of "the impending publication of the new Flora of Worcestershire [Amphlett and Rea 1909]". Allen was elected Secretary, but resigned before the next meeting in December 1909, whereupon the committee "decided that it was impossible for them to undertake the responsibility of publishing the Flora of Shropshire under present circumstances" and dissolved.

At its annual meeting the next February, the Caradoc and Severn Valley Field Club decided to ask the committee "to remain in office for the present with the addition of Rev. W. G. D. Fletcher and Mr E. S. Cobbold". Meeting two months later, the committee decided that "the Introduction as sketched out by Mr. Hamilton required revision". Cobbold was elected Secretary and Treasurer and was asked "to write to Mr. Hamilton asking him to forward the remainder of the Flora M.S. and to tell him the general results of the meeting". Hamilton died later in the year at Caversham, Oxfordshire. Next year (1911) the committee divided among its members the task of revising and shortening the text, and Melvill, after examining "eighteen other County Floras", recommended "the style of printing of that of Cheshire [Warren 1899], but that the size of page might advantageously be enlarged to that of Warwickshire [Bagnall 1891]". Cobbold was to "obtain estimates of the cost of printing on this basis".

In 1912 the committee agreed to accept the estimate of Messrs Wilding and Son of Shrewsbury and approved the style of printing shown in the proof sheet reproduced as Fig. 2.1 (actually the Cheshire page size). Printing and binding of 500 copies of 800 pages, with six full-page illustrations, were to cost £166 (without extras). It was also agreed to include photographs of *Astrantia major* and of Bomere Pool (the site of *Scheuchzeria palustris*, by now extinct in the county) and to reproduce portraits of Leighton, Phillips, Hamilton, Benson and Painter. A decision was taken not to print the lists of fungi, lichens and algae at present. A "draft circular soliciting subscriptions" was approved, and the committee recommended to the Club that "at least £230 be secured by subscription or guarantee".

Fig. 2.1 *Proof sheet for unpublished Flora of Shropshire, supplied 1912*



RANUNCULACEAE. 7

RANUNCULACEAE.

CLEMATIS L.

C. Vitalba L. Traveller's Joy. Old Man's Beard.

Top. Bot. 1, Darby MS. Lt. 255, 529. Syme E.B. I. 2.

English type. Rare in Salop, often a survival from a ruined garden. First record: Rev. E. W. M.SS., 1798 ? (Lt.)

1. Brown Hill, near Ruyton-of-the-Eleven-Towns; *Eyton* (*Lt.*). Hardwick and Criftins, near Ellesmere; *Feilden*.
3. Llanymynech; *Whitwell, Feilden.* "Apparently wild" *Beckwith.*
4. Shelton Rough; lane from Meole to Sutton; *Phillips's list.* Potteries Railway, Shrewsbury; *Hamilton.* Hedgerow in Meole Village, *Melvill.*
5. Marrington (? wild); *Horwood.*
8. Harley Churchyard; *Brookes* (*Lt.*). Benthall Edge; *Potts and Allen.*
9. Whitcliffe, Ludlow; *Spare* (*Lt.*). Near Priors Halton; *Weyman.*
10. Wenlock Edge; Middlehope; Holgate; *Thompson.*
11. Between Wellington and Dothill Park; *Lees* (*Lt.*).
12. Cottage garden hedge between Norley Green and Willey; *Rev. E. W. M.SS.* (*Lt.*). Eardington Forge; *Duncan.*
13. Lincoln's Hill; *Dickinson* (*Lt.*). "Apparently wild"; *Beckwith.* Coalport; *Painter.*

THALICTRUM L.

T. minus L. A. Collinum (Wallr.). Lesser Meadow Rue.

Top. Bot. 3, Syme herb. Lt. 254. Syme, E.B. I. 4. 3—5 Scottish type. Rare.

12. Near Button Oak in Wyre Forest; *Lees* (*Lt.*).

T. flavum L. Meadow Rue.

Top. Bot. 4, Lloyd sp. Lt. 255, 529. Syme, E.B.I. 9, 8. English type. Banks of rivers, ditches, and moist meadows. Not common. First record: *Rev. E. W. M.SS.* 1798 ? (*Lt.*).

3. Marsh Lane, Shrawardine; *Herb. Miss Lloyd.*
4. Banks of the Severn near Cronkhill; near Underdale; *Rev. E. W. M.SS.* (*Lt.*).
7 or 11. Banks of the Tern at Duncot; *Rev.E. W. M.SS.* (*Lt.*). Banks of Tern, and ditches in Attingham Park; *Beckwith* and *Serjeantson.*
7. River Roden 1½ miles below Wem; *Jebb.*
8. Near Longnor; *Griffiths.*
9. Oakley Park meadows; *Spare* (*Lt.*).
11. (et vide 7). Sydney Moors; *Beacall.*
12. Banks of the Severn near Bridgnorth; *Beckwith.*
13. Banks of the Severn opposite Buildwas; *Brookes* (*Lt.*). Near Leighton, Buildwas, and Bridgnorth; *Beckwith.*

Var. sphærocarpum (Lej. and Court).

8. Banks of the Severn opposite Buildwas; *Brookes* (*Herb. Mus. Sal.*).

Some 1,500 circulars were sent out, and, by February 1913, offers of subscriptions at 10s 6d each "amounted to £51.9.0 and those for contributions to the Guarantee Fund to £69.3.6—total £120.12.6". By July there were still only 107 offers of subscriptions, amounting to £56.3.6. The lists survive, and it is interesting to find among the names of subscribers those of G Claridge Druce, T J Foggitt, C E Salmon and A G (later Sir Arthur) Tansley. "It was considered inadvisable to reckon on the whole of the guarantee fund and . . . it was agreed that Publication be indefinitely postponed for the present." The manuscript was "to be got together" and Forrest was to "hand it to Librarian of the Sh^{y} Free Library to be kept on loan from the Club, till it may be required in the future". So the much-revised Flora, now representing the results of 16 years' work, once again failed to achieve publication.

2.13 The Dark Ages

The half-century of Shropshire botany following the abandonment in 1913 of the plan to publish a new Flora has been likened to the Dark Ages. Certainly the region was not in the limelight of botanical activity, but, as in the medieval Dark Ages, the flame was never wholly extinguished. In particular, the Caradoc and Severn Valley Field Club published plant records for all but the darkest years such as 1934, when its *Record of Bare Facts* (No. 44) reported that none "of special interest were made", and 1936 (No. 46), when the manuscript was "most unfortunately lost"! The more significant of these records have been used in Chapter 10.

Mention can be made here of only a few of the botanists of this period. **Dr Maurice Gepp** (1860–1947) was born in Essex and came to Shropshire in 1897, to serve as Medical Officer of Health first for Shrewsbury and later for South-West Salop till his retirement in 1941. He joined the Field Club in 1900, was its President in 1928 and 1943, and for 20 years acted as its Referee for Meteorology; he also contributed plant records and several articles on botanical subjects, including one on orchids published in 1941 in the Club's *Transactions*. He was a batchelor, a keen motor-cyclist and, later, driver of "distinctly rakish" open coupés, a collector of antiques and books, and an enthusiast for things mechanical, equipping a room at his home, Thornycroft House in Coton Hill, Shrewsbury, as a workshop (Lloyd 1956).

George Potts (1866–1945) was born at Broseley and educated at Shrewsbury School and Pembroke College, Cambridge. He took his BA in 1888, qualified as a solicitor in 1892 (Venn 1953) and joined his father's practice at Broseley, finally becoming controlling partner; he succeeded his father and grandfather as Registrar of Madeley County Court in 1909 and became Registrar at Bridgnorth also in 1922. He lived at Benthall House, Broseley. Potts was a keen cricketer, tennis player and follower of foxhounds, always on foot, and L C Lloyd (see overleaf) described him as "pre-eminently a *field* naturalist: an observer rather than a student or a collector", with "little taste for the library or the laboratory". He completed 50 years' membership of the Field Club, whose *Record of Bare Facts* contains "hundreds of his observations—botanical, entomological, ornithological—bearing eloquent witness to his indefatigable interest in all forms of wild life" (Lloyd and Gepp 1946). He published little besides a paper in 1931, "Orchids of Mid-Shropshire", which includes a locality near Wyke, Much Wenlock, for *Ophrys insectifera*, where "one year" he saw "over seventy specimens" but normally "about a dozen"; Gepp reports a field meeting in June 1932 when Potts and his daughter "disclosed" this orchid "in its one shy and secluded haunt" (Lloyd and Gepp 1946).

Arthur Augustine Dallman ALS (1883–1963) was born in Cumberland (Desmond 1977). He became a biology teacher and lived in Cheshire and later in Doncaster. Between 1907 and 1913 he published several papers in *The Journal of Botany* based on his extensive fieldwork in Denbighshire and Flintshire; but he never produced his intended *magnum opus* on the flora of these two counties, though he did issue a prospectus and appeal for subscriptions in 1923 (Ellis 1974). He was Editor of *The North Western Naturalist* from 1926 to 1955. In the lean years of the 1930s he took Shropshire under his wing and acted, from Doncaster, as the Field Club's Referee for Botany. He died at Colwyn Bay (Desmond 1977).

Ellen R Lloyd (*fl* 1910–1960) of Westbourne, Gobowen, succeeded Dallman in this office (later renamed Recorder), which she held for about ten years. She was also Chairman of the Botany Section of the Offa Field Club from 1938 (Carter 1960). The Caradoc Club published a number of her records in 1928, and she became a major contributor to *Record of Bare Facts*. Her annotated copy of Diamond's (1891) Oswestry Flora (see 2.11) survives; among interesting entries are the addition of *Thalictrum flavum* on 17 June 1933, described in *Record of Bare Facts* (No. 43) as "thriving . . . in a wet ditch near Ebnal, Gobowen", but in 1941 (No. 51) as having apparently died out, though "several seedlings found in hedge nearby"; a list of casual or ruderal plants "opp. Pontfaen bridge" in July 1939 with *Reseda lutea* (not recorded by Diamond)—*Consolida ambigua, Melilotus alba, Potentilla norvegica* and *Hyoscyamus niger*; undated records of *Agrostemma githago* (one plant) and *Centaurea cyanus* at Gobowen and of *Petasites fragrans* at Hengoed; and a note of *Cicerbita macrophylla* at St Martin's in August 1927, identified by "Dr Melville [*sic*]" and also reported in *Record of Bare Facts* (Nos. 37 and 43).

Norah M Mackenzie succeeded Miss Lloyd as Recorder in 1951 and was in turn succeeded in 1954 by **Edward Montagu Rutter** (1890–1963), who held the post till his death, when Miss Mackenzie resumed it jointly with **Honor F Pendlebury**, née **Leeke** (see Preface). Rutter came to live in Shrewsbury on his retirement in 1949 from the post of Area Superintendent of the London and North Eastern Railway at York. He was a widower and lived with his unmarried sister at Eversley in Kennedy Road, Shrewsbury, and was determined to keep himself fully occupied in his retirement. He quickly became active in the Field Club, becoming a Vice-President in 1951, and in the Shropshire Archaeological Society and "was the virtual founder of the Shropshire Ornithological Society" in 1955 and its Chairman till 1959. He also played a leading part in the foundation of the Shropshire Conservation Trust in 1962 (Anon. 1964).

Rutter set about teaching himself botany and made a very thorough job of it, becoming an early addict of the new *Flora of the British Isles* (1952) by Clapham, Tutin and Warburg. He set himself to put in order and supplement the long-neglected herbarium at Shrewsbury Museum, of which he became *de facto* Curator; one of his notebooks contains a list of 149 specimens added to the herbarium by the end of 1961, with localities and the "botanical divisions" used for the unpublished Flora and the account in the Victoria County History (Hamilton *et al* 1908; see 2.12). These divisions also formed the basis of the species entries in *Handlist of the Shropshire Flora,* compiled jointly with L C Lloyd and published by the Field Club in 1957.

Llewelyn Cyril Lloyd FLS (1905?–1968) was born in Nottingham and came to Shrewsbury in 1931 to assist his father in producing *Shrewsbury Circular*; he was a Master Printer and became head of the business on his father's death in 1943. His obituary (Pilgrim 1968) in the Shropshire Archaeological Society's *Transactions* paints him as a charming and gifted man with a wide range of interests, latterly especially local history, a flair for teaching exercised in adult classes organised by the Extramural Department of the University of Birmingham, but above all a determination "to remain an amateur", which he did "in the very best sense of the word". Lloyd was Honorary Secretary of the Field Club from 1940 to 1956, he succeeded H E Forrest (see 2.12) as Recorder for Zoology (except Insects) and he was President in 1954 and 1955; he also held office in the Shropshire Archaeological Society and latterly acted as Honorary Archivist and Curator to the Borough of Much Wenlock. He died at his home at Cardeston, to which he had moved from 231 Wenlock Road, Shrewsbury.

Perusal of Rutter's botanical notebooks for 1951 to 1961 and of his Recorder's Reports on Botany in the Field Club's *Transactions* (which latterly incorporated *Record of Bare Facts*) for 1954 to 1962 reveals him as a field botanist in a mould familiar to us today. There is a sudden sense of familiarity as now well-known botanical sites, several of which he discovered, are mentioned—Boreton Bank in 1953, Brown Moss (probably explored at the suggestion of Edward A Wilson, then Senior Biology Master at Ellesmere College) in 1955 and Venus Pool in 1956—or as authors of this Flora are mentioned—Charles Sinker, on Llynclys Hill in July 1951 and reported as shortly coming to establish Preston Montford Field

Centre in the Report for 1956, and "Dr. F. H. Perring of Cambridge University" leading a visit of the Botanical Society of the British Isles to Shropshire from 8 to 15 July 1961 "with the special object of filling gaps in our knowledge of the Flora of the County". We have reached modern times.

2.14 Bibliographical references in Chapter 2

The following list provides bibliographical details of the works quoted in this chapter, except some that do not contain material directly relevant to the flora of the Shropshire Region and for which adequate information is given in the text. Unreferenced biographical details and dates of birth and death of botanists are chiefly taken from R Desmond's (1977) *Dictionary of British and Irish Botanists and Horticulturists*, where possible checked and supplemented by consulting *The Dictionary of National Biography*, D H Kent and D E Allen's (1984) *British and Irish Herbaria* and other standard works including J and J A Venn's (1922–1927) *Alumni Cantabrigienses* Part I, J A Venn's (1940–1954) Part II, Joseph Foster's (1888 and 1891–1892) *Alumni Oxonienses, The Clergy List* and *Crockford's Clerical Directory*. Unfortunately the draft for the biographical chapter of the unpublished Flora (see 2.12) is missing, but much of it is presumably reproduced in the Victoria History of Shropshire (Hamilton *et al* 1908). The fullest previous account of Shropshire botanists is P W Carter's (1960) "The botanical exploration of Shropshire", but this contains numerous copying errors and other inaccuracies and is most useful as a pointer to earlier sources.

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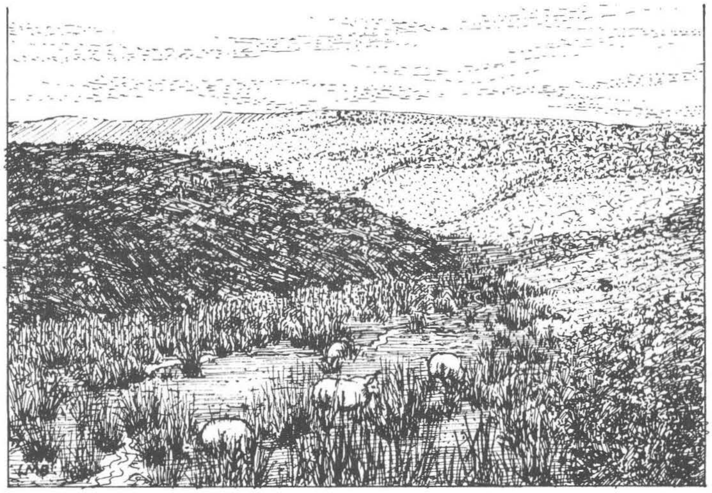
3 The environmental background



Long Mynd plateau near the Boiling Well

3.1 Introduction

NATURALISTS have long been fascinated by problems associated with the distribution of plants in space and time. If a plant is established and able to reproduce in a particular site its ancestors must have been able to reach the area, and it can be assumed that the soil and climatic conditions are at least not unsuitable for it. The species must also be able to resist competition from neighbouring plants as well as other biotic pressures, such as grazing and trampling by animals. The physical background plays an important role in helping to determine the distributions of the 1200 or so vascular plants found in the Shropshire Region. These have not only very varied distributions, but also different geographical affinities and physiological responses, being affected, for instance, in various ways by different soil types, very cold winters (e.g. 1981–2) or exceptionally dry summers (e.g. 1976).

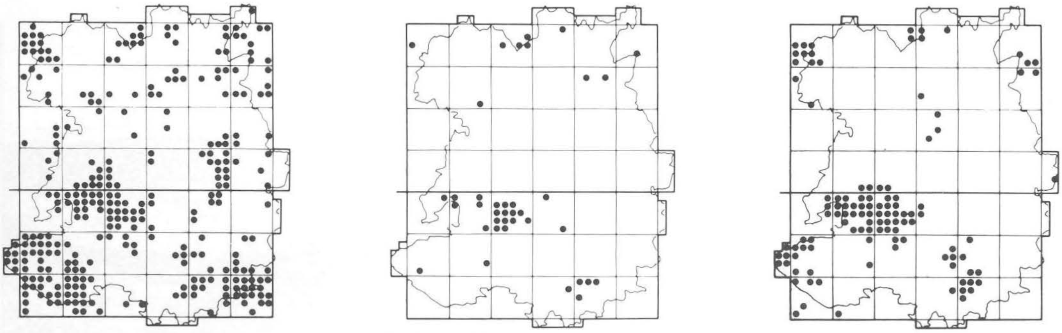
Figure 3.1 shows the distribution patterns of a dozen plant species, each with its own distinctive ecological requirements and representing a more or less particular vegetation type. Heather or ling (1) is a very common **calcifuge** ('lime-avoider') on the most acid upland soils, but is also found on lowland heaths, on the peat of the north Shropshire 'mosses', and on old colliery pit-mounds. It is interesting to compare this same map in Chapter 10 with those of some related species: bell-heather, mainly on dry, acid, sunny hillsides; cross-leaved heath, on wetter, peaty soils; and bilberry, a fire-favoured understorey to heather, behaving as a sun-plant on the hilltops but a shade-plant at lower altitudes.

Round-leaved sundew (2) is a carnivorous bog plant, requiring humid air as well as wet peat or sphagnum moss to grow in, but needing very little in the way of mineral nutrients. Mat-grass (3) is common on the high moors and poor acid pastures of hills such as the Long Mynd and the Clees, unpalatable to livestock and encouraged by grazing and trampling. The mountain pansy (4), a beautiful flower of traditionally managed hill pastures, is now sadly diminished, like the green-winged orchid formerly quite widespread in old meadows. So also is the meadow saffron (5), a plant of old damp grasslands on clay; it flowers in autumn but its leaves, poisonous to cattle, appear in spring. Bogs and damp meadows, which also support several orchid species and other attractive flowers, are among the most threatened habitats in Britain: draining, ploughing, reseeding and the application of fertilisers transform their physical and chemical properties and eliminate most of their 'native' flora.

Heavy base-rich clays and limestone still carry many interesting woodlands and hedgerows, where yellow archangel (6) flourishes even in deep shade. Areas of hard limestone with shallow soils are quite limited in this region: yellow-wort (7) is a **calcicole** ('lime-loving') plant of short turf and quarry floors whose distribution picks out the limestone outcrops of Wenlock Edge and the Oswestry hills, though it is by no means confined to them. Wild thyme (8) is also found on limestone but is common on other hard rocks and on impoverished sandy soils as well. It is a drought-resistant herb of sunny banks and warm open hillsides: it even prefers the south end of anthills, in spite of the enhanced root-disturbing activity of the yellow hill-ant there.

Another **thermophilous** ('warmth-loving') species, but one of very different distribution, is white bryony (9). It is a scrambling plant of hedgerows and waste ground on nutrient-rich soils, commonest in those parts of the lowlands which enjoy the highest summer temperatures and probably the lowest rainfall. Yellow water-lily (10) is also mainly a lowland plant, growing in still or slow-flowing waters of moderate depth; meres and disused canals suit it well. Tansy (11), although sometimes a garden escape on roadsides, seems to have its natural home on the alluvial banks of larger rivers: parts of the course of the Severn can be traced on its map.

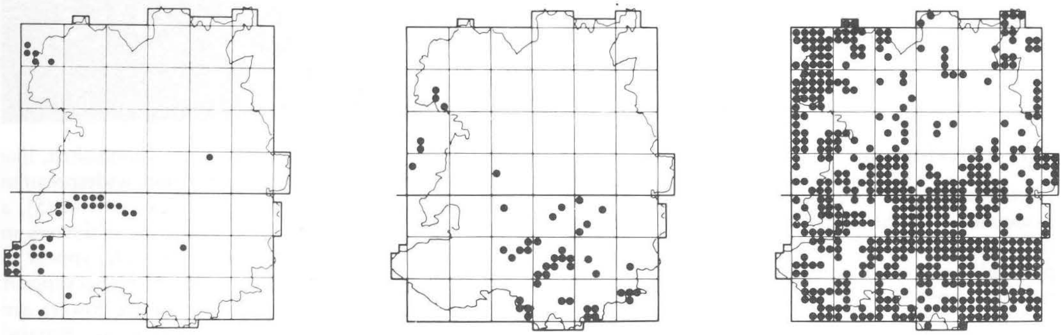
The final example is a naturalized alien, the pink purslane (12), found on damp shady roadsides and in



1 *Heather* Calluna vulgaris

2 *Round-leaved sundew* Drosera rotundifolia

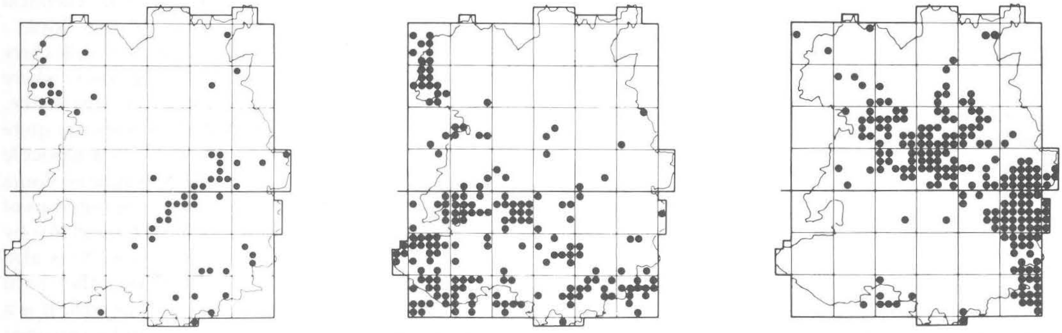
3 *Mat-grass* Nardus stricta



4 *Mountain pansy* Viola lutea

5 *Meadow saffron* Colchicum autumnale

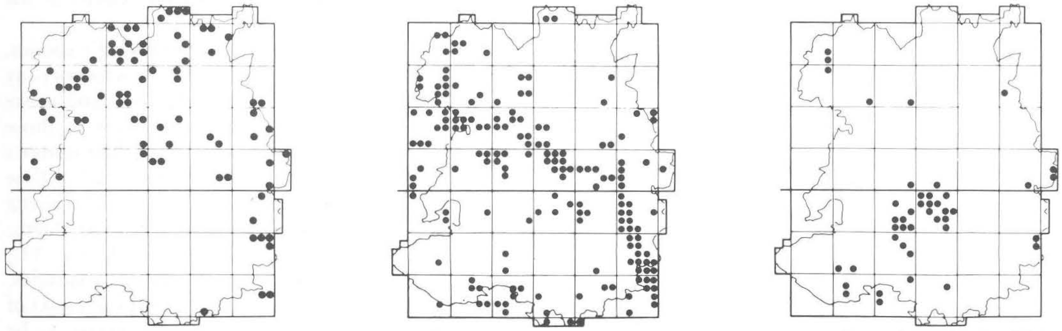
6 *Yellow archangel* Lamiastrum galeobdolon



7 *Yellow-wort* Blackstonia perfoliata

8 *Wild thyme* Thymus praecox *ssp.* arcticus

9 *White bryony* Bryonia dioica



10 *Yellow water-lily* Nuphar lutea

11 *Tansy* Tanacetum vulgare

12 *Pink purslane* Montia sibirica

Fig. 3.1 *Twelve contrasting plant distribution patterns.*

woods. First recorded at Burwarton in 1897, it appears to be spreading slowly outwards from a number of sites of introduction. The biggest 'patch' on the map is roughly centred on a long-known locality at Chatwall Hall. This species is clearly still extending its range, and has as yet occupied by no means all the territory suitable for it. It is a useful warning not to read too much of ecological significance into the distribution maps of individual species, a point discussed further in the section on 'coincidence mapping' in Chapter 9.

The geology, topography, soils, land use and climate of the Shropshire Region are topics of great interest which have been investigated by numerous specialists. Our task is merely to outline the ways in which such factors influence the vegetation and the distributions of individual species. Though the English weather has a reputation for being fickle, if not perfidious, the topography and geology of a particular area seem reassuringly permanent to its residents. Nevertheless, all three are in fact changing, though at very different rates, and the plant and animal populations are in a constant state of flux. This Flora is not, however, so ambitious as to attempt to deal with detailed changes in plant communities in this or previous interglacial periods; we are concerned in the main with present-day plant distributions as they relate to existing features of the environment.

Features of their surroundings which affect organisms are known as **environmental factors**, often grouped under the headings of soil, water, temperature, light, atmosphere, fire and 'biotic' factors. Perhaps the most striking way in which flowering plants differ from the majority of animals is their inability to move. Although shoots can grow towards light and roots towards water, the general position of the plant is fixed; indeed, a seedling will only become established if the conditions surrounding it are suitable at that particular time. Because much vegetation is so effectively closed that competition prevents the entry of new individuals, the 'gap' or **regeneration niche** created when mature plants die is of great importance (Grubb 1977).

Relatively wide and uniform outcrops of contrasting rock types are a feature of most counties in east and south-east England. Landforms and soil types associated with particular rocks extend over considerable distances, and are reflected in the distribution maps for many species in the *Flora of Essex* (Jermyn 1974), *Atlas of the Kent Flora* (Philp 1982) and the *Sussex Plants Atlas* (Hall 1980). The same cannot be said of the Shropshire Region, where a narrow rock outcrop, an abrupt change of slope, local shading or a hill stream can cause marked changes in the environment, often reflected in the vegetation, within a metre or two. A patchwork cover of glacial drift further complicates the matter, making it hazardous to predict from a geological or a topographical map what soil type, plant community or species may occur at a particular spot.

There are three reasons why tetrad maps of drift types are not used here:

(a) Published maps on a sufficiently large scale only exist for parts of the region.

(b) The limits of glaciation and of the associated drift cover are still in dispute. In the Church Stretton district, for example, maps produced by the Institute of Geological Sciences and the Soil Survey disagree on this point.

(c) Where compatible large scale maps of soils and drift types are available, as for the Wem District, the patchwork is so intricate that three or four major drift or soil types can often be found within the same tetrad.

For these reasons we reluctantly decided that it was only possible to present tetrad maps of certain very distinct formations, such as limestones and a small selection of soil types (see Fig. 3.2). More general data on drift geology, and also on land use, are displayed in the form of simple histograms (Fig. 3.11 and 3.16).

3.2 Climate

Climate influences the distribution of plants both directly, as by the action of a late frost, and indirectly by its influence upon the soil formed under particular temperature and moisture regimes. Although the Shropshire Region is in geographical terms a small one, it encompasses a wide range of environmental conditions. This variety of micro-climatic and soil conditions allows species with very different physiological tolerances and geographical affinities (see Chapter 4) to exist within an environmental mosaic that often alters from yard to yard and hour to hour.

Climate is discussed here in terms of how it influences the distribution of vegetation types and particular species within the Shropshire Region, but it is also interesting to relate the climate of Shropshire to that of the surrounding land areas. This can be done by consulting the account of the effects of climate on plant distribution given by J. P. Savidge in *Flowering Plants of Wales* (Ellis 1983) and its coloured bioclimatic map (from Bendelow and Hartnup 1980) which fortunately includes the greater part of the Shropshire Region.

It is the continual operation of the whole climatic complex—all the climatic factors interacting together—and of occasional catastrophic events, such as extreme cold or drought, which largely determines plant distribution. Nevertheless, it is worthwhile to follow Savidge in attempting to correlate the distribution of plant species with particular features of past and present climate. These include:

(a) Air and soil temperatures and their seasonal pattern.

(b) The length and intensity of the growing season.

(c) The frequency and intensity of frost, and in particular the likelihood of early and late killing frosts below –3°C.

(d) The amount and seasonal distribution of precipitation, which in Shropshire is mainly as rain.

(e) Snow cover and duration.

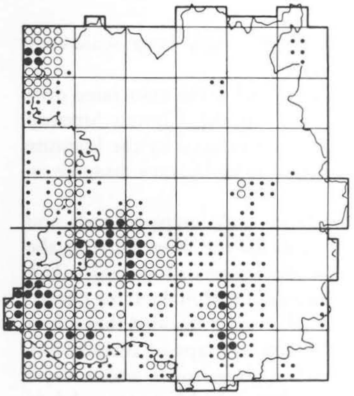


Fig. 3.2a Altitude: ● *some land over 1400ft (427m),* ○ *some land over 1000ft (305m),* · *some land over 600ft (183m)*

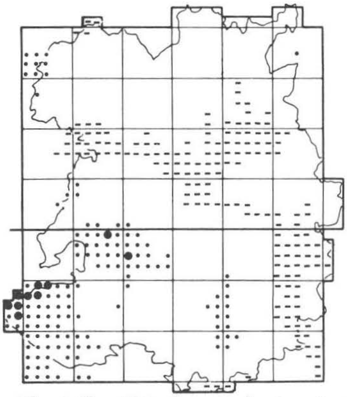


Fig. 3.2b Altitude: ● *no land under 1000ft (305m),* · *no land under 600ft (183m),* - *some land under 200ft (61m)*

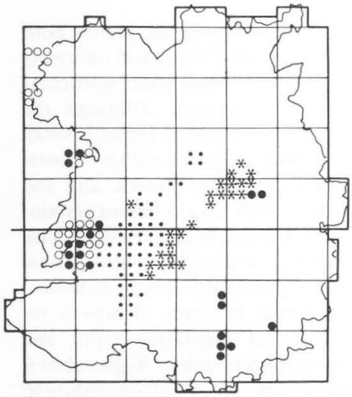


Fig. 3.2c Geology, igneous and ancient: ● *dolerite and basalt in Ordovician and Carboniferous,* ○ *Ordovician volcanic ashes etc,* · *Precambrian (Longmyndian) sedimentary complex,* * *Precambrian (Uriconian) igneous complex*

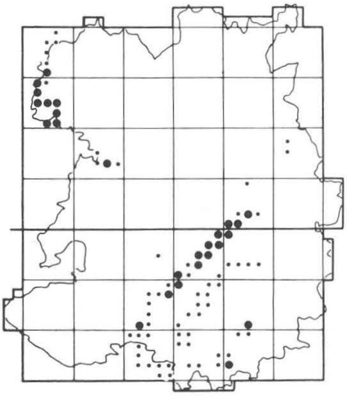


Fig. 3.2d Geology, limestones: · *outcrops shown on some geological maps,* ● *limestone quarries and cliffs*

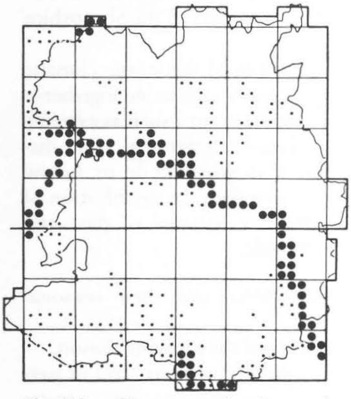


Fig. 3.2e Rivers: ● *major rivers,* · *large tributaries*

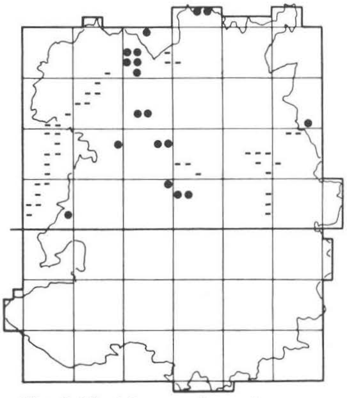
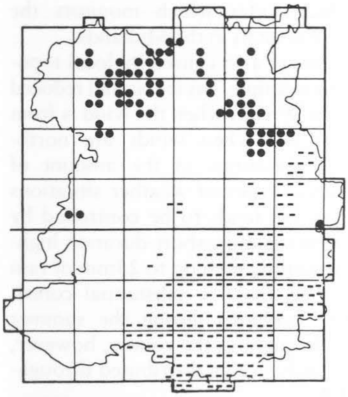
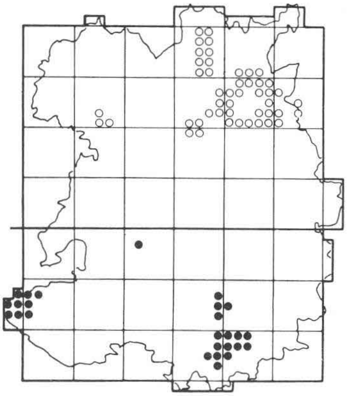


Fig. 3.2f Meres and canals: ● *meres,* - *canals (disused but still holding water)*

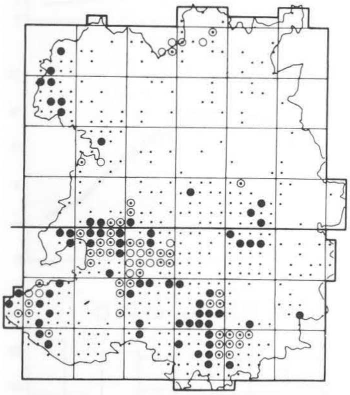
Fig. 3.2 *Selected environmental features plotted by tetrads. (S) indicates data shown for Shropshire only.*



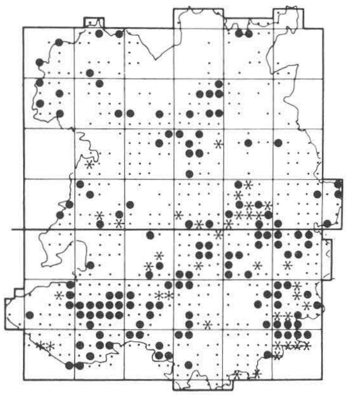
(S) **Fig. 3.2g** Soils: ● *peat and earthy peat in lowland (Association 10 in Burnham and Mackney 1964);* - *argillic brown earths, sometimes with gleying, on basic shales of Silurian, Devonian and Upper Coal Measures (B & M Assoc. 2)*



(S) **Fig. 3.2h** Soils: ● *wet (to dry) upland heath on cambic stagnogley and stagnohumic gley soils, locally podzols (B & M Assoc. 6);* ○ *former dry and wet lowland heath on podzols and gley podzols over Pleistocene sands and gravels (B & M Assoc. 8)*



(S) **Fig. 3.2i** Old grassland: ● *10 or more separate old fields per tetrad;* • *1 to 9 separate old fields per tetrad;* ○ *>10% area unenclosed moor, heath or rough grazing. Based on STNC Prime Sites Survey (1980)*



(S) **Fig. 3.2j** Old woodland: ● *1st ed OS map (1830s) has woods in 3 or 4 quarter-squares of tetrad;* • *1st ed OS map has woods in only 1 or 2 quarter-squares of tetrad;* ∗ *'ecologically interesting' woods still exist in 3 or 4 quarter-squares of tetrad. Based on I C Bolt's NCC Woodland Survey (1977)*

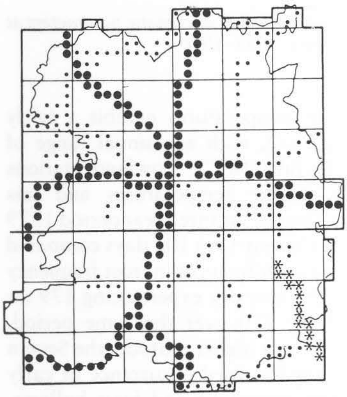


Fig. 3.2k *Railways:* ● *British Rail lines still open (1984),* ∗*Severn Valley Railway,* • *disused track (standard gauge and former mineral lines)*

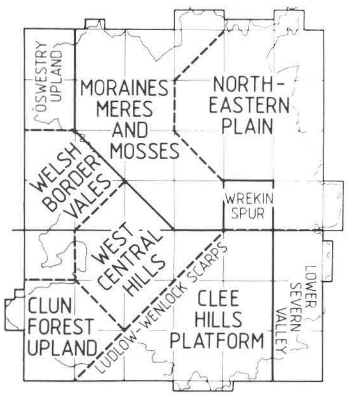


Fig. 3.2l Geographical subdivisions of the Shropshire Region: *the bold line separates upland south and west from lowland north and east*

(f) Humidity and transpiration losses.
(g) Wind strength and direction; degree of exposure.
(h) Duration and intensity of sunshine.
(i) Atmospheric quality and the changes in the levels of such pollutants as sulphur dioxide, fluorinated compounds and particulate matter.

The main aspects of climate all vary spatially, affected both by regional gradients such as Shropshire's position in the shelter of the Cambrian Hills, and by more local topography. The region is some distance from the moderating influence of the sea and its considerable climatic diversity is enhanced by the exposed northern plain, the sheltered valleys of the Border country and the distinctive shapes of the Shropshire hills.

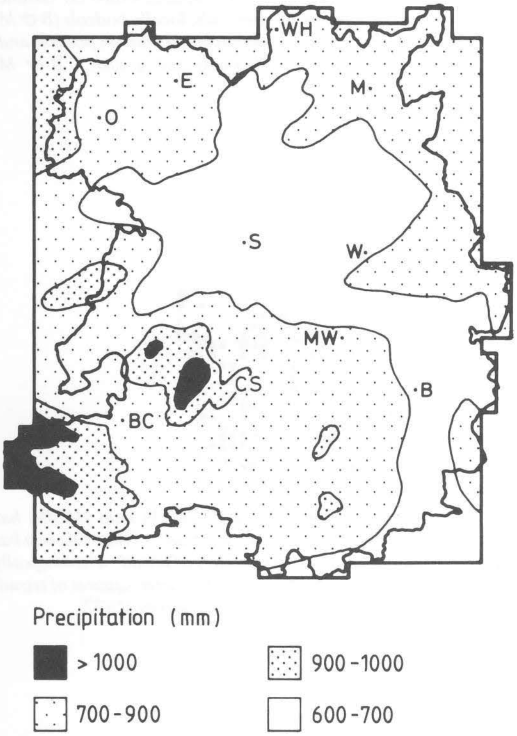


Fig. 3.3 *Distribution of mean annual rainfall in the Shropshire Region.*

CLIMATIC PARAMETERS

Fig. 3.3 illustrates the regional variation of mean annual rainfall plotted from the 1916–50 averages (Meteorological Office 1974). A marked precipitation gradient exists from above 1200 mm on western hills to about 650 mm on the central and eastern lowlands. Isolated upland masses in mid-Shropshire, such as the Clee Hills, receive comparable totals to the western borders, attesting to the significance of altitudinal controls on precipitation. The summit of Titterstone Clee is itself noteworthy as the location of a Meteorological Office radar which monitors the movement of weather systems in the Midlands.

Rainshadow effects are also caused by local topography. Newport, for example, has its rainfall reduced by the presence of the Wrekin when the wind is from the south-west, but not when winds are north-westerly. Significant variations in the amount of rainfall from particular types of weather situations occur, and while rainfall tends to be controlled by altitude in the western uplands, short-duration high-intensity convective storms, with up to 25mm of rain falling within an hour, make a substantial contribution in the drier lowlands during the summer (Matthews 1972). Throughout the county, however, the precipitation is fairly evenly distributed throughout the year (Fig. 3.4).

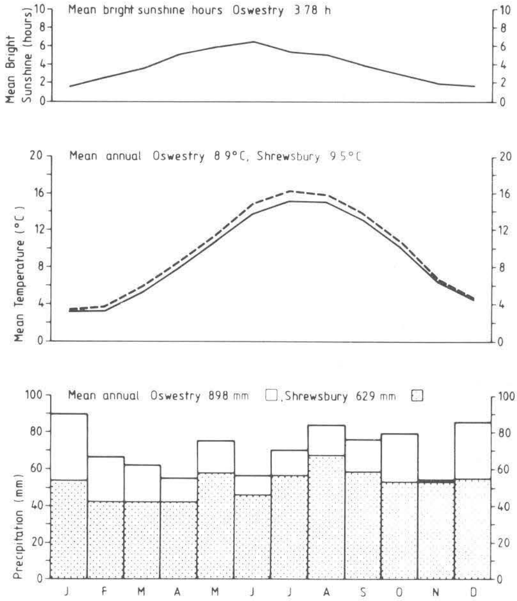


Fig. 3.4 *Mean seasonal variation in climatic parameters at Oswestry and Shrewsbury (1941–1970).*

Monthly mean air temperatures exhibit a fairly large variation (Fig. 3.4), with an annual range of 13°C (January 3°C–July 16°C). Lowland stations experience slightly higher temperatures and less frequent snow falls. During the three year period 1979 to 1981 snow fell at Oswestry on 102 days compared with 56 at Shrewsbury. Differences in frost frequency are less marked, with Oswestry experiencing 179 air frosts and Shrewsbury 170 over the same period. Although Oswestry is at a higher altitude, the Severn valley is noted for the localised occurrence of early morning temperature inversions and frost hollows. The mean date (1957–75) of the last air frost at Shrewsbury is 4 May and the first is 20 October.

Climatic parameters have been summarised in Table 3.1. Figures for actual stations are given and can

Table 3.1 *Summary of selected climatic values for the Shropshire Region*

				Agroclimatic Region		
		Shrewsbury	*Oswestry*	18N	18S	19
Altitude (m)		55	174	Av: 126	Av: 210	Av: 119
Mean annual precipitation (mm)		629.4	898.0	763	845	700
Mean air temperature (°C)	Jan	3.3	3.1	2.9	2.4	2.8
	July	16.1	15.1	15.6	15.2	15.8
Mean soil temperature (°C) at 30 cm depth	Jan	4.5	—	3.6	3.4	3.5
	July	17.6	—	16.1	15.6	16.9
Mean annual potential transpiration (mm)		—	—	497	481	498
Maximum soil moisture deficit (mm)		—	—	88	75	95
Solar radiation $mW\ h^{-1}\ cm^{-2}$	Jan	—	—	60	65	60
	July			435	435	430
Average hours bright sunshine per day	Jan	1.46	1.39	—	—	—
	July	5.54	5.35	—	—	—
Mean day length (h)	Jan	—	—	9.5	9.6	9.5
	July	—	—	17.9	17.8	17.9
Growing season (days above 6°C)		—	—	245	228	240

be compared alongside representative figures calculated for the three main Agroclimatic Regions, designated and used by the Ministry of Agriculture, which cover most of the county (Smith, 1976). Though such representative figures are of considerable value in making generalisations about large areas, major climatic variations may exist within the areas themselves. Region 18 (North) consists chiefly of Shropshire north of the Wrekin and is a dairy farming area with some general cropping, while 18 (South) is the hill and vale country of south-west Shropshire (excluding the small area around Clun) that is used largely for livestock farming but with some arable land. Region 19 is a general cropping area with some dairying that embraces south-east Shropshire and north Worcestershire. These Agroclimatic Regions were obtained by subdividing counties into areas with broad similarities of farming type, on the justifiable assumption that farmers in selecting a similar type of enterprise have correctly assessed suitable conditions of climate and soil. Such areas should therefore be far more homogeneous in many ways than an administrative county.

EFFECTS OF INCREASING ALTITUDE

Within the British Isles climatic parameters change markedly with increasing height (Manley 1952, Taylor 1976). This results in a rapidly increasing severity of climate with altitude even in hill country of only moderate relief (500 m in altitude here is roughly equivalent to 1500 m in Central Europe). Thus a lowland patchwork of pastures and arable fields, diverse woodlands and hedgerows, gives way rapidly to rough grassland and treeless dwarf shrub communities within a height rise of 100–200 metres. Greater altitudes lead to increases of windspeed, rainfall, relative humidity, amount of cloud and frequency of ground freezing. These changes, combined with generally reduced air temperature, radiation input, evapotranspiration and growing season, cause upland environments to become agriculturally marginal. In the past they have been less affected than the lowlands by agricultural improvements and many retain great botanical interest.

Table 3.2 illustrates changes in climatic parameters with altitude, while Fig. 3.5 give the altitude/area distributions for the 42 10km squares of the Shropshire Rectangle. Analysis of the 1916–50 rainfall data shows a strong positive association between rainfall and altitude in the county; the relationship can be expressed quantitatively as: $R = 661 + 1.09H$ where R = average annual rainfall (mm) and H = altitude (m). Roughly, this indicates an increase of 1 mm in the annual rainfall for each metre rise in altitude (Fig. 3.6).

The reduction (or lapse) of temperature with height is also of major importance. When a body of air at low altitude ascends it expands because of the lower pressures aloft and so cools. The degree of cooling is dependent on the moisture content of the air. For dry air the temperature will fall at 1°C per 100m rise, while in the moist air much more typical of our climate the fall due to this effect is about 0.6°C per 100m rise, although some variation does exist (Taylor 1976). The overall picture may be locally affected by heat sources

Table 3.2 *Altitudinal variation of climatic parameters*

Climatic parameter	*Season*	*Direction of change*	*Approximate rate change per 100m rise in altitude*
Rainfall		Increase	100mm per year
Mean temperature		Decrease	0.6°C
Max temperature		Decrease	0.7°C
Min temperature		Decrease	0.5°C
Wind		Increase	20–30%
Sunshine	January	Decrease	0.11h day^{-1}
	July	Decrease	0.21h day^{-1}
Soil temperatures (at 30 cm depth).	January	Decrease	0.25°C
	July	Decrease	0.85°C
Accumulated temperature (degrees days above 10°C).	May-Oct	Decrease	100–110
Solar radiation	January	Decrease	$1.7\text{mW h}^{-1}\text{ cm}^{-2}$
	July	Decrease	6.9 " "
Potential transpiration.	Winter	Decrease	10mm
	Summer	Decrease	17.5mm
Soil moisture Deficit.		Decrease	20–25mm
Growing season (days when temperature at 30 cm depth is above 6°C.		Decrease	20–25 days

For further details of estimated climatic-lapse rates see Smith 1976, Taylor 1976.

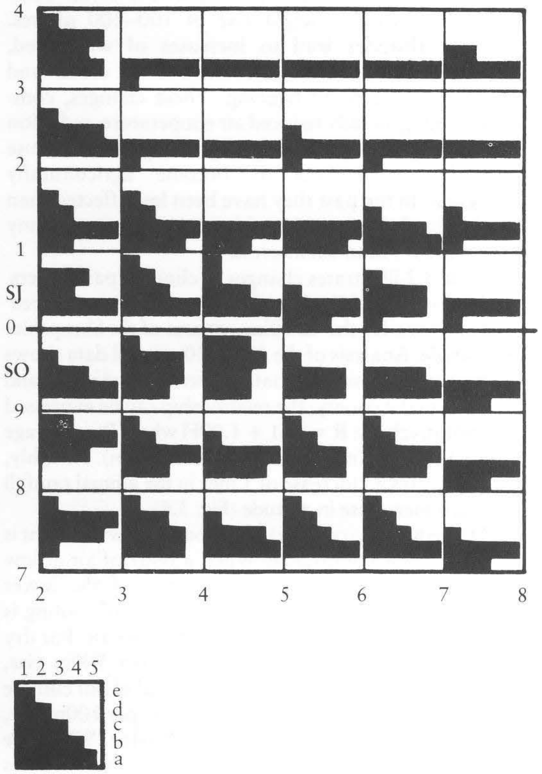


Fig. 3.5 *Altitudinal distribution of land in the 42 10km squares of the Shropshire rectangle. The length of each horizontal bar represents the proportion of the land in that square lying between the heights indicated. The lowest strip in each square is for land below 200ft (76m), the next one up, between 200 and 600ft (183m), and so on. The miniature histograms thus provide a model of the relief: the middle squares in the top row, for example, indicate a rather flat lowland plain between 200 and 600ft in elevation; the bottom left corner square shows a moderately high plateau dissected by valleys but with little land below 600ft or above 1400ft (427m); the two bottom row near-right squares have a high but isolated hill rising gently from lowland. Each shape has different implications for local climate, land-use and vegetation.*

e 1400–1800ft (427–549m) above OD	*5 > 50% of area*
d 1000–1400ft (305–427m) above OD	*4 25–50% of area*
c 600–1000ft (183–305m) above OD	*3 10–24% of area*
b 200–600ft (76–183m) above OD	*2 5–9% of area*
a below 200 ft (76m) above OD	*1 < 5% of area*

and sinks provided by the ground surface in contact with the air, and by the drainage of cold dense air down slopes which proved particularly significant in the cold winter of 1981/2 (see below).

ASPECT AND SLOPE

Altitudinal controls are further complicated by considerations of aspect and slope (Geiger 1965, Jones 1976). Clearly south-facing slopes experience proportionally more direct sunlight (both in terms of strength and duration) than north-facing slopes or even level ground; they are also more exposed to prevailing winds. In summer at 50°N a steep south-facing slope receives about 90mW cm^{-2} at midday, while a north-facing slope receives only 35mW cm^{-2}. In winter the contrast is even more striking, the same south-facing slope receives 60mW cm^{-2} at midday while the north-facing slope has no direct sunlight at

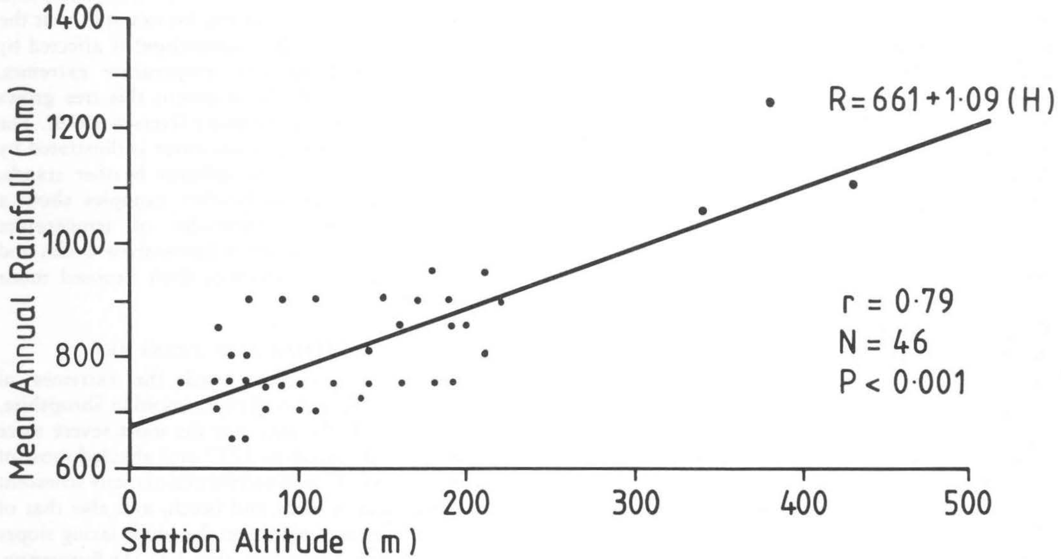


Fig. 3.6 *Plot of mean annual rainfall (1916–1950) against altitude for 46 Shropshire weather stations. Note that the altitude/rainfall values of some of the lowland stations were virtually identical so that only 38 points could be plotted.*

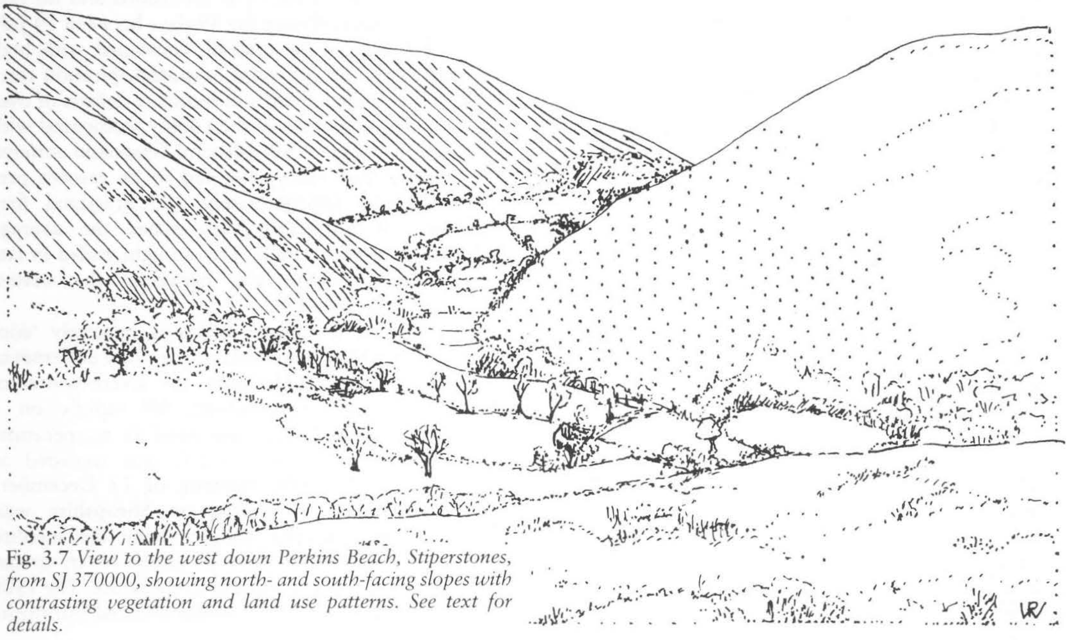


Fig. 3.7 *View to the west down Perkins Beach, Stiperstones, from SJ 370000, showing north- and south-facing slopes with contrasting vegetation and land use patterns. See text for details.*

all. The consequences of this affect both temperatures and surface water balance.

The sketch of Perkin's Beach (Fig. 3.7), a steep valley cut into the western flank of the Stiperstones, illustrates contrasts of this kind. The slope on the right faces south: it suffers from daily and seasonal climatic extremes. Numerous ribs of rock are exposed through the thin and unstable soil cover which bears a drought tolerant vegetation similar to heathlands in southern England; only at the foot of this slope is there a deep enough accumulation of soil for the small gardens of the cottages which nestle there in comparative warmth and shelter. The north-facing slopes on the left enjoy a more equable microclimate, cool even by day, and have a deeper and more stable soil with moorland vegetation including ferns and even *Sphagnum*; small fields of improved pasture reach halfway up this slope. Similar patterns of contrast can be seen in Ashes Hollow and other valleys in the Long Mynd.

Variations in sunlight receipt in relation to aspect are largely responsible for the differences in vegetation found on south- and north-facing slopes (see 3.2), and the prolonged survival of snow patches on sheltered northerly slopes such as those on the Clee Hills (Mitchell 1979).

SOILS AND VEGETATION COVER

The soil climate is a significant feature of the overall environment of the plant cover. In particular the texture of a soil and its drainage characteristics affect the thermal and hydrologic regimes which plants experience.

The proportion of solar energy reflected by a soil surface depends in part upon its colour and moisture content. Dark soils may have a percentage reflectance (*albedo*) as low as only 5% while light coloured soils may reflect up to 45% in certain situations (Sellers 1965). A moist soil has a lower albedo than an otherwise equivalent dry soil. The capacity of soils to heat up and to transfer heat down through the soil varies widely according to texture and moisture content, wet soils having significantly higher thermal conductivities (Table 3.3). The effect of snow cover in ameliorating the rate of soil temperature change is also important (Fullen and Smith 1983).

Table 3.3 *Penetration depth of temperature fluctuations*

	Rock	*Wet sand*	*Dry sand*
Daily fluctuations (cm)	108	76	24
Annual fluctuations (cm)	2060	1450	460
Relative thermal conductivity	2.0	1.0	0.1

The combined effects of surface heating and drainage influence the moisture state of a soil, and Shropshire soils exhibit a substantial range of behaviour, from the drought-vulnerable and rapidly draining soils developed on the Triassic sandstones and glacial sands in the east, to silty clays and poorly drained organic soils in the hill country.

The vegetation cover modifies the surface climate and itself gives rise to a number of environmental gradients. For example, the ground flora within a woodland stand frequently experiences a climate in marked contrast to that of the trees forming the canopy. Micro-climates within lower growing vegetation also differ from those of the free air. Of most significance generally is the buffering of temperatures and relative humidities within a vegetation stand which ameliorates the extremes (maxima and minima) of free air. It is known, for example, that the distribution of holly (*Ilex aquifolium*) is affected by both winter and summer temperature extremes, indeed in less favourable situations this tree grows only within a woodland canopy (Iversen 1944). The modifying effect of vegetation cover is illustrated by comparison of burnt and unburnt heather stands, where measurements in heather canopies show a climate with lower amplitudes of temperature variation, a lower number of freeze-thaw cycles and much reduced wind velocities than exposed moor (Fullen 1983).

CLIMATIC VARIATION AND EXTREMES

Statistical averages often mask the extremes of drought, warmth and cold experienced in Shropshire. The 1975–1976 drought was the most severe since reliable records began in 1727 and affected most of western Europe. It hastened the end of many senescent trees, particularly birch and beech, and also that of many older heather plants on the south-facing slopes of the Shropshire hills (see also 3.3). At Burwarton, east of Brown Clee, 460mm of rain fell between 1 September 1975 and 31 August 1976, only 53.5% of average. Between January and August 1976 there were 163 days without measurable rain. In the summer, drought conditions intensified and no rain fell at Burwarton during the 39 days between 19 July and 27 August. Low rainfall, combined with high temperatures and potential evapotranspiration rates of about 350mm caused soil moisture deficits of over 300mm in some areas of the county, compared with summer averages of 50–100mm. Grassland suffered so severely that many leys had to be resown prematurely and approximately 300 grassland fires occurred in Shropshire, ten times the average (Doornkamp *et al* 1980). The drought ended in late August with heavy rain, heralding the wettest September on record.

In contrast, a climate which is relatively 'continental' by British standards can produce extremes of cold such as occurred during the severe winter of 1981–1982. Air temperatures fell rapidly on 7 December and the lowest confirmed air temperature in the British Isles of −25.2°C was recorded at Shawbury in the early morning of 13 December. [Extremely cold air centred on Shropshire was confirmed by infra-red imagery from the satellite Meteosat 2. In the absence of cloud cover, image colour corresponds to ground temperature. The 1800 GMT photograph of 12 December showed Shropshire ground temperatures to be less than –15°C, enveloped by relatively warmer air in adjacent areas (*Weather*, March 1983.)] After a warmer unsettled spell between 28 December and 6 January 1982 severe conditions prevailed again until 16 January. On 10 January temperatures fell to –26.1°C at Newport, still a record low temperature for England.

A large number of evergreens in north-east Shropshire were apparently devastated by the extreme low temperatures of certain nights during the winter of 1981–82. Yews and cypresses (both Lawson's and Leyland) turned brown: this effect was often most marked on the side of the trees from which the snow melted first. The impact of the cold on the vegetation of the Shropshire hills was less severe than might have been expected. At The Hollies, for example, the ancient trees of *Ilex aquifolium* were undamaged at 330m above OD. Broom (*Cytisus scoparius*) was destroyed only at the foot of slopes, and although gorse (*Ulex europaeus*) died back locally many stumps sprouted again.

The more intense frost damage noted by several correspondents in lowland areas included exotic trees such as cedars and *Quercus ilex*, and shrubs such as cherry laurel and garden privet, but not, surprisingly, box. Privet hedges sprouted from near the ground many months later, and at least one of us regretted the overhasty removal of a well grown *Pyracantha*. Seemingly dead holly stems developed odd, unsightly tufts of new leaves. At Bishop's Castle three patches of holly hedge were cut to the ground, but trees allowed to grow up in them were not seriously affected. In SO 48 foliage of pedunculate oak (*Quercus robur*) developed very late in river valleys and other exposed places. The trees had a stag-headed look in 1982, and late growth leaves were larger than usual.

In the longer term, plants themselves may be the best indicators and integrators of the climatic variables which affect them. Species—and, indeed, individuals—vary in their response to particular factors, but by selecting a group of species which appear to have similar preferences and observing their geographical distribution and local frequencies we can learn much about medium-scale patterns of climate. The figures illustrate this with two examples; in both cases the current survey's tetrad records for twelve species are combined for each 10 × 10km square of the Shropshire Rectangle, and shown as a block whose width indicates the number of species present and whose height the total records. Block width is thus roughly correlated with habitat diversity, and block height with the extent of suitable habitats in the square.

Figure 3.8 is based on a group of species whose ranges of distribution in Europe show a strong westerly bias: they are assigned in Chapter 4 to the Oceanic West European Element. Such plants are favoured by comparatively mild winters with little risk of late spring frosts; they are tolerant of cool, wet summers, and most of them are sensitive to drought, preferring a humid atmosphere and rather high rainfall well distributed through the year. The most favourable parts of the Shropshire Region appear to be the West Central Hills (Stiperstones and Long Mynd) and parts of the Clun Forest and Oswestry Uplands. Note, however, the 'Weald effect' in the extreme south-east: just as the outlying occurrence of (for instance) *Wahlenbergia hederacea* in East Sussex and Kent seems to demonstrate the existence of a pocket of oceanicity there, so the survival of ancient woodland—the Wyre Forest—on acid Coal Measure soils in these secluded valleys enables half a dozen 'oceanic' species to penetrate the generally inhospitable lowlands.

The species used in Fig. 3.9 are placed in the Continental Southern Element in Chapter 4. They are tolerant of high summer temperatures, low rainfall and drought. Some, such as *Bryonia dioica* (*B.cretica*), are near the northern limit of a range which reaches southwards to the Mediterranean and beyond. Within our region they behave mainly as lowland species, and are most strongly represented in the Lower Severn Valley.

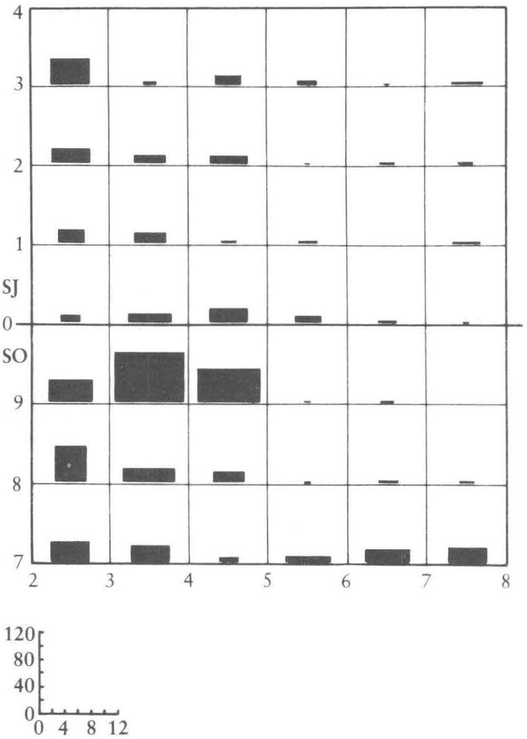


Fig. 3.8 *The number of records/number of species per 10km square for a dozen Oceanic West European species* (Carex binervis, C. laevigata, Erica cinerea, E. tetralix, Hypericum elodes, Lepidium heterophyllum, Myosotis secunda, Oenanthe crocata, Ranunculus omiophyllus, Scutellaria minor, Sedum anglicum, Wahlenbergia hederacea).

The width of the block in each 10km×10km square of the Shropshire Rectangle indicates the number of species present and is thus roughly correlated with habitat diversity. Block height gives the total number of tetrad records and gives an indication of the extent of suitable habitats in the square.

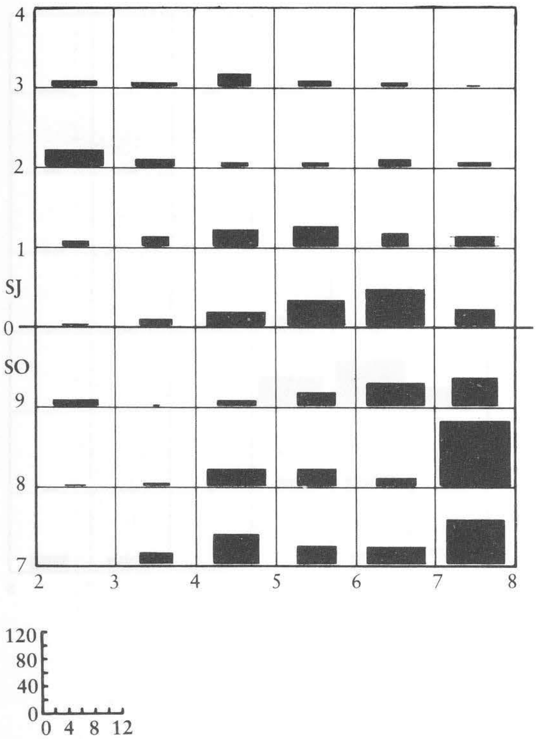


Fig. 3.9 *The number of records/number of species per 10km square for a dozen Continental Southern species* (Blackstonia perfoliata, Bromus erectus, Bryonia dioica, Carex pendula, Colchicum autumnale, Euphorbia amygdaloides, Filago vulgaris, Hordeum murinum, Picris echioides, Pulicaria dysenterica, Viscum album, Vulpia myuros).

Finally, a little can be said about changes in air quality and the increasing acidification of rainfall. The marked gradient in the frequency of occurrence and species diversity of lichens (and to some extent of bryophytes) across the county, reducing in both cases from west to east, probably results from the deterioration of air quality (especially increased sulphur dioxide concentrations) near industrial centres.

The flora may also be affected by aerial eutrophication resulting from the widespread drifting of fertiliser dust in dry weather. Strong evidence for this is provided by recent changes in the moss and lichen floras of tree trunks in agricultural as opposed to non-agricultural situations in this country (James 1973).

3.3 Topography and Geology

The north of the Shropshire Region is relatively flat, open, low-lying and geologically simple. In the south the uplands are geologically complex and possess rocks of many different ages. Much of their topography and the related drainage pattern is controlled by a structure in which 'soft' or weak rocks may alternate with, or be faulted against, 'hard' (more accurately 'resistant') formations. The complexity of the geology and tectonic history, which continue to pose intriguing problems, has attracted many famous geologists to the region. The work of Murchison, Lapworth, Watts, Cobbold, Whittard and many others is summarised in the *British Regional Geology of the Welsh Borderland* (1971), a similar guide to Central England (1969) and a number of other recent publications including Toghill and Chell (1984). The major physical features and drainage of the region are shown in Fig. 1.0, while the solid geology, which greatly influences surface relief, is illustrated by Fig. 3.10. Fig. 3.11 gives the surface geology within the Shropshire Rectangle, while Fig. 3.12 and 3.13 provide five geological sections.

Important as the solid geology may be, some of the most significant influences on soils and vegetation are the effects, direct and indirect, of the last Pleistocene Ice Age. Ice sheets and glaciers entered the region from the north and west (Shaw 1972), trimming the ends of hill-spurs, grinding down summits and leaving oversteepened crags such as Craig Breidden (and perhaps Blodwel Rock) in their wake. Particularly during the advancing and waning stages of glaciation, rivers were diverted into new courses and meltwater streams carved dramatic channels through the most resistant rocks. The gorges at Ironbridge and Downton are large-scale examples of such diversions, and the numerous smaller features of similar origin include the Hope Valley near Minsterley, the Habberley Valley beside Earls Hill, and Marrington Dingle—all sites of considerable botanical interest.

The ice sheets met and mingled on the north Shropshire plain, where they buried an older landscape under great thicknesses of till (boulder clay), morainic ridges, and sheets of sand and gravel laid down by meltwater and cratered with kettle-holes where detached blocks of ice had been left. Such landforms resulted in the formation of the meres and mosses whose water and marsh plants are such a characteristic feature of Cheshire and of north Shropshire (Sinker 1962).

The south-eastern quarter of the region—roughly, the area south east of Wenlock Edge—and part of the west central hills (Stiperstones and Long Mynd) were not covered by ice, but suffered the harsh climate of an arctic area. The quartzite tors and stone stripes of the Stiperstones and the massive dolerite block screes of Titterstone Clee are among the conspicuous products of periglacial conditions.

Geological maps such as Fig. 3.10 essentially show the age of rocks found in various places. Plant distributions, however, are very largely controlled by quite specific soil characteristics such as drainage, nutrient content or texture. The sediments being laid down, and the igneous rocks being formed, in various places at any one time differ widely in their texture and base content. Consequently two soils derived from rocks of the same age may be very unlike each other and attract quite different floras. Conversely soils on

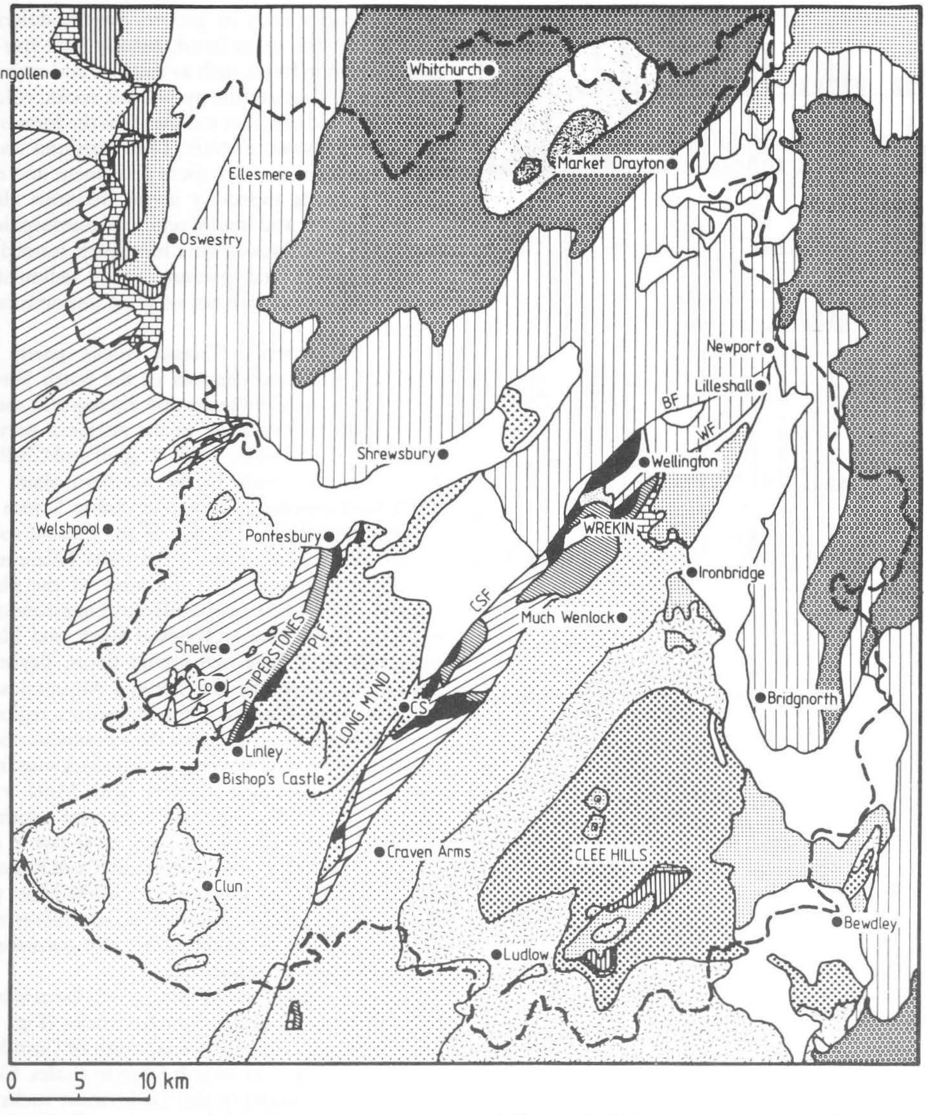


Fig. 3.10 *Geological Map of Shropshire (Redrawn from Toghill and Chell 1984, by courtesy of the Field Studies Council). No differentiation is made between normal and faulted boundaries.*

JURASSIC
- ▩ Middle Lias
- ░ Lower Lias

TRIASSIC
- ▩ "Keuper"

PERMO-TRIASSIC
- ▥ "Bunter"

CARBONIFEROUS
- ☐ Upper Coal Measures

CARBONIFEROUS
- ░ Lower & Middle Coal Measures
- ▥ "Millstone Grit"
- ▦ Carboniferous Limestone

DEVONIAN
- ▩ Old Red Sandstone

SILURIAN
- ░ Downtonian
- ░ Marine Silurian

ORDOVICIAN ▨

CAMBRIAN ▨

PRE-CAMBRIAN
- ░ Longmyndian
- ■ Uriconian
- ░ Rushton Schist

░ Intrusive & extrusive andesites, basalts & dolerites

BF, Brockton Fault; Co, Corndon; CS, Church Stretton; CSF, Church Stretton Fault; WF, Wrekin Fault.

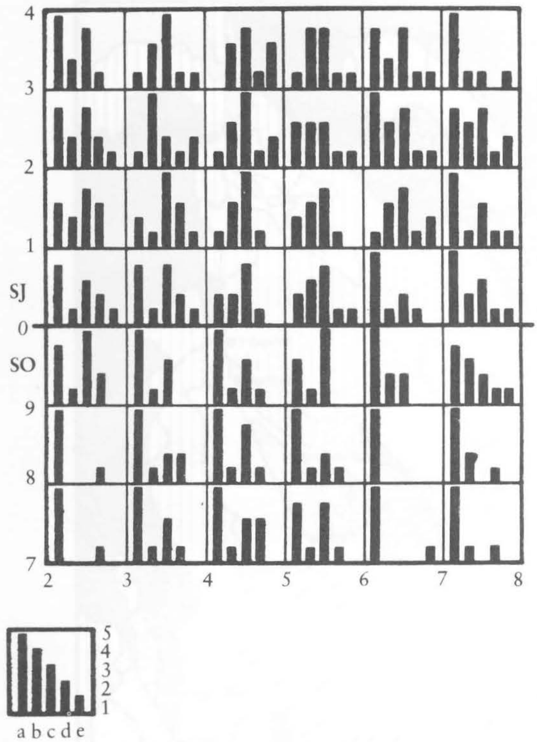


Fig. 3.11 *Superficial geology of the 42 10km squares of the Shropshire Rectangle. The height of each vertical bar represents the proportion of the land surface in that square occupied by outcrops of solid rock or by the type of drift indicated. Apparently unglaciated areas in the south-east and south-west show clearly.*

a Solid rock outcrop covered only by soil or head
b Fluvioglacial sands and gravels, river terraces, etc.
c Boulder clay (till) and morainic drift
d Alluvium and lake silt
e Peat

5 > 50% of area
4 25–50% of area
3 10–24% of area
2 5–9% of area
1 < 5% of area

rocks of different ages, such as those developed on the Wenlock (Middle Silurian), Aymestry (Upper Silurian) and Carboniferous limestones, all of which support calcicoles such as yellow-wort (*Blackstonia perfoliata*) and autumn gentian (*Gentianella amarella*) can be very similar as far as their suitability for particular species of plant is concerned.

Shropshire geology is dominated, at least quantitatively, by sedimentary rocks such as sandstones and quartzites, siltstones, mudstones, shales, conglomerates and limestones. They consist of mineral fragments which were mostly deposited by wind or water and have since become consolidated or even so indurated that some are now, as in the Precambrian Longmyndian rocks, exceedingly hard. **Igneous rocks** form when molten magma cools, and may be rich in free quartz and poor in bases ('acidic' rocks such as granite, rhyolite, felsite and granophyre). Basic igneous rocks such as picrite, basalt, dolerite and gabbro, on the other hand, usually lack free quartz and are rich in bases such as calcium and magnesium. In a special class are the **pyroclastic rocks**, volcanic in origin but laid down as sediments in the form of ashes, technically known as tuffs. Their hardness and often high base content make them prominent and ecologically interesting especially in the Breidden Hills, the Shelve district and the Wrekin. **Metamorphic rocks** such as the Rushton schists have been formed by the action of heat and pressure upon sedimentary or igneous rocks, but are not of great importance in the region.

The downwarped Triassic rocks partly buried beneath the glacial deposits of the north Shropshire plain are bounded by faults and dip towards the north, Jurassic strata appearing in the northern part of the Prees syncline (Dineley 1960, Toghill and Chell 1984). At the southern edge of the northern plain, and its southward extension along the lower Severn Valley past Bridgnorth, Coal Measures and Triassic rocks rest on the slopes and spurs of the older Palaeozoic and Precambrian massifs. To the west of the plain are Selattyn Hill and the Carboniferous Limestone of Craig Sychtyn, Porth y waen,Blodwel Rock and Llanymynech Hill with their rich orchid floras. Beyond, and outside our area, lie the Berwyn Mountains which produce a rain shadow in the Shropshire region; their foothills bring moorland into the extreme north-west.

Working around the region anti-clockwise from the north-west, Breidden (366m) and Moel y Golfa (403m) are the first important features south of the Severn. The dolerite of Breidden gives rise to soils as base-rich as that on many limestones and its flora is of particular interest (Sinker 1970), while Moel y Golfa is formed largely of andesite; its south-western end and the summit of Middletown Hill consisting of a coarse volcanic conglomerate.

The Long Mountain (408m), a well-farmed plateau, is a syncline of Upper Silurian rocks (Fig. 3.12a), separated from the dolerite laccolith of Corndon Hill by a broad valley cut in soft Silurian shales. Corndon Hill is a high point in the Ordovician rocks of the Shelve district, which has Silurian strata to the south and is bounded to the south-east by the jagged ridge of the Stiperstones quartzite resting uncomformably on Cambrian Shales (Fig. 3.12b). Bilberry, cowberry (*Vaccinium vitis-idaea*), heather and wavy hair-grass flourish on the acid soils of the Stiperstones ridge, and in August bell-heather colours the south-facing sides of the steep valleys ('beaches' or 'batches') that cut its western flank. To the east of the Stiperstones the ground falls away to the East Onny valley until the Cambrian shales meet, along the line of the Pontesford-Linley Fault a huge area of Precambrian volcanics, grits, flags and conglomerates with a high to vertical dip which contains a recumbent syncline. This outcrop includes the Long Mynd plateau, which has an area of 10–13km^2, reaches a height of 517m at Pole Bank, and is bounded along its south-western margin by the Longmynd fault, which gives rise to a prominent west-

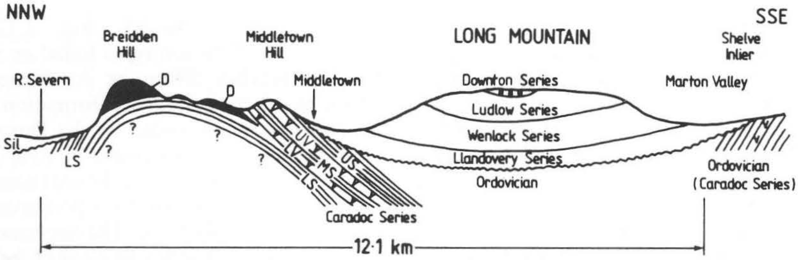


Fig. 3.12a *Geological section across the Breidden anticline and Long Mountain syncline.*

D, Dolerite; Sil, Silurian; LS, Lower Shales; LV, Lower Volcanics; MS, Middle Shales; UV, Upper Volcanics; US, Upper Shales. Thickness of beds not to scale. (From Toghill and Chell 1984, by courtesy of the Field Studies Council.)

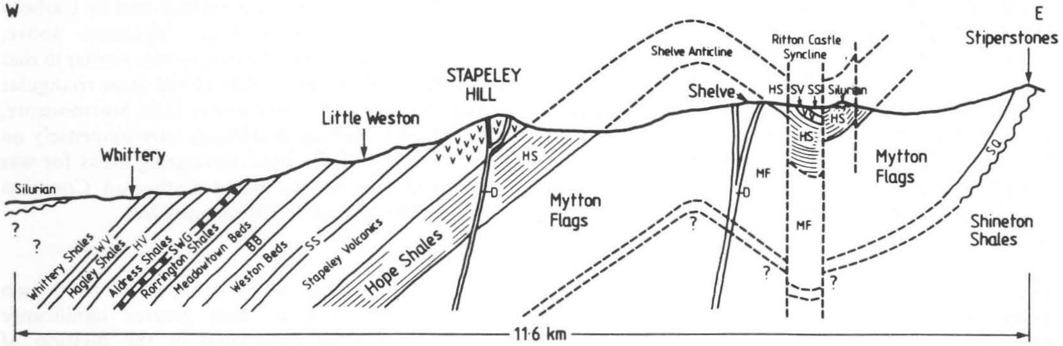


Fig. 3.12b *Geological section through the Ordovician rocks of the Shelve area. West of Stapeley Hill the section is diagrammatic. Information from map in Whittard (compiled by Dean) (1979).*

WV, Whittery Volcanics; HV, Hagley Volcanics; SWG, Spy Wood Grit; BB, Betton Beds; SS, Stapeley Shales; SV, Stapeley Volcanics; HS, Hope Shales; MF, Mytton Flags; SQ, Stiperstones Quartzite; D, Dolerite. Thickness of beds not to scale. (From Toghill and Chell 1984, by courtesy of the Field Studies Council.)

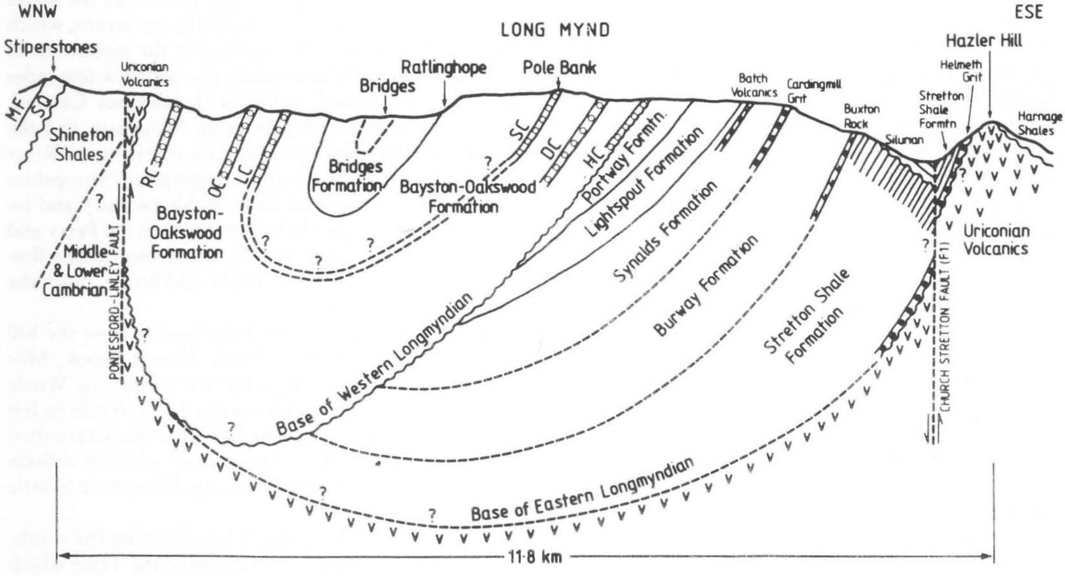


Fig. 3.12c *Geological section from the Stiperstones to Church Stretton showing the recumbent syncline and associated faults.*

MF, Mytton Flags; SQ, Stiperstones Quartzite; RC, Radlith Conglomerate; OC, Oakswood Conglomerate; LC, Lawnhill Conglomerate; SC, Stanbatch Conglomerate; DC, Darnford Conglomerate; HC, Haughmond Conglomerate. Thickness of beds not to scale. (From Toghill and Chell 1984, by courtesy of the Field Studies Council.)

facing scarp. On its eastern side is the Church Stretton valley followed by the main branch of the Church Stretton fault. The streams on the west side are mainly small and short, occupying relatively shallow valleys, whereas those valleys running eastwards such as Cardingmill, Townbrook, Ashes Hollow, Callow Hollow and Minton Batch are long, deeply incised and, in their lower parts, floored with stony rubble and alluvium. This area of moor, heath and grassland is of great interest, containing many flush communities and a profusion of bryophytes.

The Longmyndian rocks continue to the north-east as the Lyth Hill to Sharpstones Hill ridge, rising again north of the Severn to form Haughmond Hill. On either side of the Long Mynd are outcrops of Precambrian volcanics, of which the Western Uriconian gives rise to Pontesford Hill, (part of the Earls Hill nature reserve) and smaller igneous areas to the south-west as far as Linley Hill. Eastern Uriconian outcrops run alongside the Church Stretton fault forming the Ragleth, Caradoc and Lawley hills, all well seen on page xv, to the south of the Severn and those of the Wrekin and Ercall to the north. Angles of slope and **aspect** (the direction towards which a site is facing) are of particular importance in hill sites during summer droughts like that of 1976. Scorched patches of dead grass and even of heather develop on the steep, south-facing rocky slopes of the Stiperstones, the Long Mynd, Earls Hill, Craig Breidden and other upland features, which experience high **insolation** (exposure to the sun's rays). These bared patches are subsequently colonized by such drought evading or resisting herbs as early hair-grass (*Aira praecox*) sheep's sorrel (*Rumex acetosella*) and heath groundsel (*Senecio sylvaticus*), as well as the mosses *Polytrichum piliferum, P. juniperinum* and *Dicranum scoparium*. North-facing slopes, on the other hand, are much cooler and damper, thus favouring bilberry and marsh plants such as glaucous sedge (*Carex flacca*) and marsh thistle (*Cirsium palustre*), as well as species more normally found in woodlands including hard fern (*Blechnum spicant*) and wood sorrel (*Oxalis acetosella*) (Packham 1979).

Almost parallel to the Eastern Uriconian range is a series of wave-like escarpments and valleys formed from Ordovician and Silurian strata, all inclined south-east, the lowest beds of the Ordovician being the grits forming the scarp of Hoar Edge east of the Lawley. The Wenlock Limestone forms the regular lower scarp of Wenlock Edge which is about 25 km long (see Fig. 3.13a); it is a relatively pure reef limestone where it is quarried in the north, changing to a shaly, mildly calcareous formation much less favoured by calcicoles further south. The reverse is true of the younger Aymestry Limestone of Ludlow age to the east of Hope Dale, which becomes more calcareous as it goes south. View Edge, Norton Camp and Callow Hill are all formed from this rock. The Silurian formations underlying the Clun Forest upland, in the south-west corner of the region, lack limestones and comprise a rather monotonous sequence of siltstones, mudstones and shales.

Continuing eastwards, Fig. 3.13b shows the structure and the soil types found on the Brown Clee which reaches 540m at its highest point. The Downton Series, the oldest formation in the Old Red Sandstone, is succeeded by the Ditton Series which forms the Dittonian platform with resistant sandstones immediately above the near basal *Psammosteus* Limestone, giving rise to a prominent scarp at the margin of the platform. The uppermost rocks of the Lower Old Red Sandstone are the Clee Beds which are covered by small unconformable outliers of Coal Measures protected from erosion by hard dolerite forming the tops of the Clee Hills. At Farlow the Upper Old Red Sandstone is surmounted by Carboniferous Limestone with Coal Measures above. Titterstone Clee (533 m) has a structure similar to that of the Brown Clee and occurs on the same triangular plateau to the south-east of Corve Dale. Soil moisture, nutrient and drainage conditions vary immensely on the Clees, one of the most interesting areas for wet heath and bog species being Catherton Common which lies to the east of Titterstone Clee.

DRAINAGE

The drainage system, which is important in its own right, formerly had an even greater significance botanically, having been used in the division of Shropshire into the districts employed in both the unpublished flora of 1913 and the *Handlist of the Shropshire Flora* (Lloyd and Rutter 1957). The extreme north-west of the region is drained by the north-flowing Dee and the Ceiriog, the extreme north-east by the Duckow. Elsewhere almost all the water flowing from the area reaches the River Severn, which rises on Pumlumon (Plinlimmon) in the mountains of mid-Wales. The Severn enters the region a few miles south of Welshpool, captures the devious Camlad, and flows north-west past Long Mountain and the Breidden Hills before turning east, receiving the River Vyrnwy near Melverley, and passing into Shropshire proper. As it flows east through Shrewsbury and on towards Ironbridge, the Severn receives the Perry and the Tern, which together with numerous other tributaries such as the Roden, Meese and Strine, drain the north Shropshire plain.

Right bank tributaries of the Severn from the hill country include the Rea Brook, Cound Brook, Mor Brook and Borle Brook, while the wandering Worfe (Robinson 1980) comes from the north to join its left (eastern) bank just above Bridgnorth. The Severn then flows on past the Wyre Forest from which it collects the Dowles Brook before leaving Shropshire a little above Bewdley.

The Onny, Redlake and Clun, draining the south-west of Shropshire, are tributaries of the Teme which eventually joins the Severn immediately south of Worcester. Near Wenlock Edge, Eaton (Byne) Brook (Fig. 1.0) flows south-west along Ape Dale to join the Onny. The River Corve passes through Corve Dale roughly parallel with Eaton Brook, receiving various streams from Brown Clee and Clee St. Margaret before swinging south to join the Teme at Ludlow, just

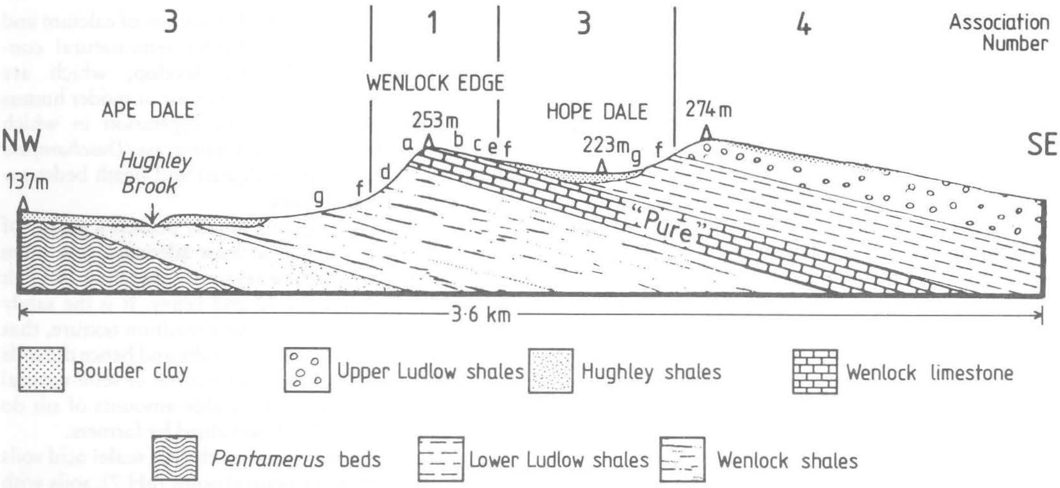


Fig 3.13a *Soil associations of the Silurian Scarplands.*
1 Typical argillic brown earths and calcareous soils.
2 Argillic brown earths (typical and stagnogleyic).
3 Typical stagnogley soils and stagnogleyic brown earths.
4 Typical brown earths: a Limestone scar in places, b Rendzina, c Shallow brown calcareous earth, d Deep brown calcareous earth on colluvium, e Typical argillic brown earth, f Gleyic argillic brown earth, g Typical stagnogley soil.

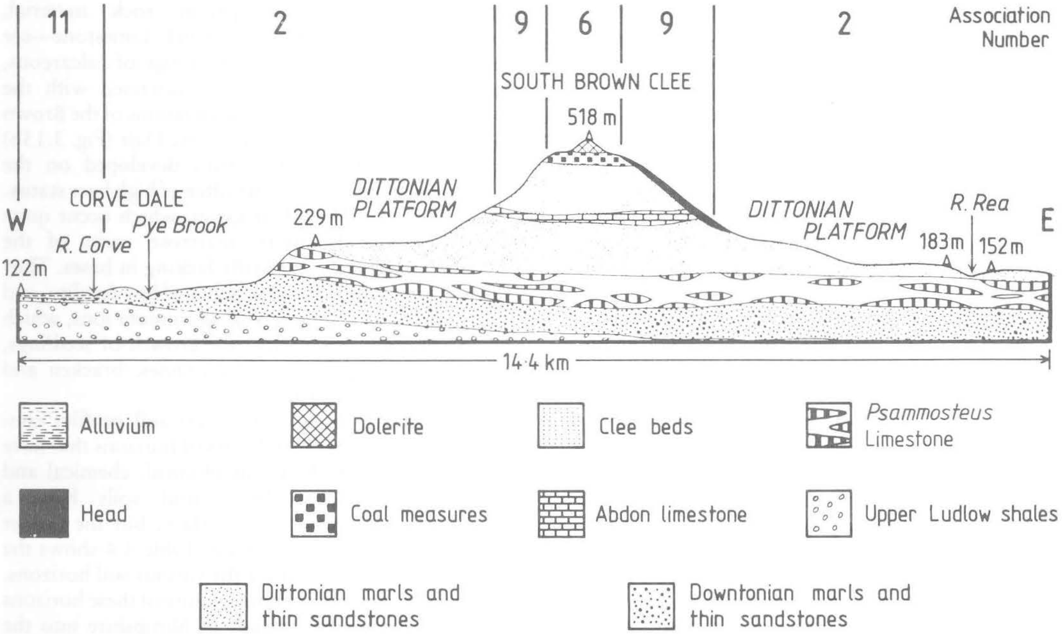


Fig. 3.13b *Soil associations of Corve Dale, the Dittonian Platform and Brown Clee.*
2 Typical argillic brown earths, (sometimes stagnogleyic, locally typical brown earths)
9 Typical brown earths and brown podzolic soils, locally brown sands
6 Cambic stagnogley and stagnohumic gley soils, locally podzols.
11 Gleyic brown alluvial soils and typical alluvial gley soils. The numbers of the soil associations are those employed by Burnham and Mackney (1964). See also Fig. 3.14. (Modified from Burnham and Mackney (1964), by courtesy of the Field Studies Council.)

after that river has passed Bringewood Chase, which contained the last known (1892) 'Shropshire' habitat of the ghost orchid (*Epipogium aphyllum*). The Ledwyche Brook and the River Rea drain a substantial part of the Clee Hills platform into the Teme above and below Tenbury respectively.

3.4 Soils

Plant distribution is strongly influenced by **soil texture, aeration, drainage, nutrient content, humus type** and **water-holding capacity** which vary greatly in the many different soil types present in the Shropshire Region. The five main soil forming factors are parent rock, topography, climate, the vegetation and associated organisms, and time. Mature soils take several millenia to form, so it is essential to prevent them eroding or having their structure degraded by unwise agricultural practice (see Reed 1979).

The parent material from which Shropshire soils have developed is very varied, as we have seen in 3.3. Soil texture largely depends on the size distribution of the minerals in the parent rock whose chemical nature, and base content in particular, greatly influences soil formation. Indeed G W Robinson, who wrote the first modern account of Shropshire soils in 1912, used the geology as the basis of his soil classification.

The first authors to describe soils under woodland and heath in Shropshire were Morley Davies and Owen (1934) who also introduced soil series mapping into Shropshire. Soil series are groupings based on parent material and the characteristics of the profile (i.e. the layers or horizons distinguishable in a vertical section through the soil). Three districts of Shropshire have been covered by Soil Series maps at 1:63,360, each with a descriptive memoir (Wem: Crompton and Osmond 1954, Church Stretton: Mackney and Burnham 1966, Ludlow: Hodgson 1972). More recent 1:25,000 maps have covered the Claverley District (Hollis 1978) and two small areas in West Shropshire (Thompson 1982).

Smaller scale maps use geographical groups of series called soil associations. The whole of Shropshire was first mapped by Burnham and Mackney (1964) at 1:253,440, the accompanying text emphasises relationships between semi-natural vegetation and soils. A complementary discussion of the properties of Shropshire soils relevant to agriculture is included in a bulletin on the West Midlands (Mackney and Burnham 1964). Agricultural Land Classification maps at 1:63,360 cover the whole of Shropshire, and have explanatory texts (Dennis 1974, Dennis and Dullage 1977, 1978) with information about climate, geology, soils and land quality.

The publication in 1983 of a 1:250,000 soil map of England and Wales has been accompanied by a new higher level taxonomic classification (Avery 1980) and new criteria for differentiating soil series (Clayden and Hollis 1984). Shropshire appears on sheet 3 (Midlands and Western England), and a regional bulletin (Ragg *et al* 1984) has been prepared.

Soil texture is in most soils mainly determined by the proportions of the mineral content of a soil belonging to the various particle size gradings, though organic matter also plays a part. Sands and loamy sands are coarse-textured; they are light, warm soils which work easily and are quickly heated in spring because their water retentivity is low. These quartzose materials, which are highly permeable, are readily leached of the normally small amounts of calcium and magnesium they contain. Under semi-natural conditions strongly acid soils develop, which are sometimes podzolic. These have mor or moder humus and support an acid-tolerant vegetation in which calcifuge species such as wavy hair-grass (*Deschampsia flexuosa*), ling (*Calluna vulgaris*) and heath bedstraw (*Galium saxatile*) abound.

Clay and clay loam soils usually possess a supply of mineral nutrients that is at least adequate, and often very substantial; their fine texture makes them difficult to drain and they are cold and heavy. It is the sandy loams and loams, which have a medium texture, that are the most valuable agriculturally and hence the soils least often encountered under natural or semi-natural conditions. Soils with appreciable amounts of silt do not possess the good tilth so valued by farmers.

Soil reaction is measured on the pH scale: acid soils have values below the neutral point (pH 7), soils with higher values are alkaline. Acidic soils often possess **mull** humus and may be quite rich in calcium ions adsorbed by colloids of the clay-humus complex, though lacking the free calcium carbonate abundant in **rendzinas** (Fig. 3.14), alkaline or nearly neutral soils rare in Shropshire, in which an organic A horizon rests directly on calcareous parent rock material. Rendzinas develop on the Wenlock Limestone—see Fig. 3.13a which illustrates the range of calcareous, brown, gleyed and acid soils associated with the Silurian scarplands. The soil associations of the Brown Clee, Dittonian platform and Corve Dale (Fig. 3.13b) vary considerably in pH, soils developed on the dolerite capping the Clees are often of high base status.

Soils with a pH of 4 or lower, which occur quite commonly on the more quartzose rocks of the Shropshire hills, are markedly lacking in bases. They possess *mor* (raw humus) which is of low fertility, and often also have high levels of aluminium ions, which are particularly harmful to the growth of seedlings, though tolerated by calcifuge grasses, bracken and members of the Ericaceae.

Pits dug in natural soils reveal **soil profiles** consisting of a number of well marked horizons that have arisen as a result of various physical, chemical and biological processes. Agricultural soils have a ploughed (Ap) layer at the surface, but the deeper layers are often little disturbed. Table 3.4 shows the system of notation used for the various soil horizons. The appearance and chemical nature of these horizons are used to classify the soils of Shropshire into the various groups shown in Table 3.5. These have been revised by Burnham from the system of Burnham and Mackney (1964), who in this and other publications have done much to elucidate edaphic problems in the region. Figure 3.14 illustrates the soil profiles of the major groups.

When substantial water passes through the soil on permeable parent materials such as sandstones, gravels and pebble beds, leaching causes podzols to develop. They will also develop on boulder clay and other substrates under the appropriate climatic con-

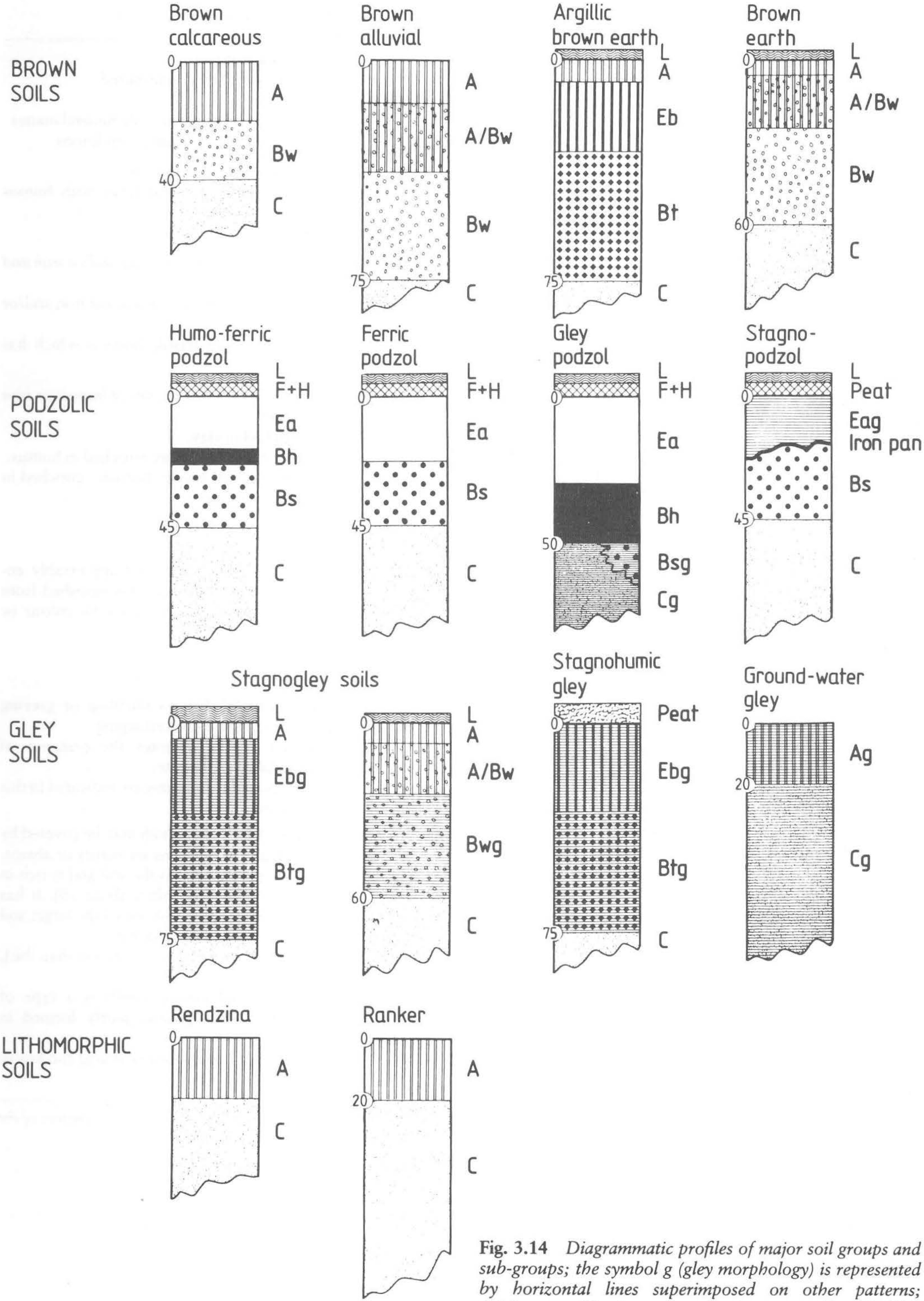


Fig. 3.14 *Diagrammatic profiles of major soil groups and sub-groups; the symbol g (gley morphology) is represented by horizontal lines superimposed on other patterns; thicknesses of horizons are only given as a guide. (Modified from Burnham and Mackney 1964, by courtesy of the Field Studies Council.)*

ditions. Podzols have a surface organic layer with a bleached Ea layer devoid of iron and aluminium beneath it. Humus is deposited in the Bh layer , while oxides of iron and aluminium washed out (eluted) from the Ea layer are redeposited in the Bs layer of these base deficient, infertile and strongly acid soils.

In valleys and low-lying areas, soils are often waterlogged for long periods and become anaerobic, lose the bright red and ochre colours associated with the presence of ferric iron, and are *gleyed.* Gley (g) horizons are often neutral to mildly acid; they are also usually deficient in phosphate. Stagnopodzols, formerly called peaty-gleyed podzols (Fig. 3.14), are very common in upland Britain where podzolization and gleying result in a thin dense iron pan and a surface layer of peat. Such soils are represented in the Portway Complex on the upper slopes of the Long Mynd.

The balance between precipitation and evapotranspiration greatly affects soil formation. In summer there is generally a deficiency of rainfall but in winter there is excess rainfall which may run off, lie on or near the surface, or percolate through the soil. The hills can have up to four or five times the winter excess rainfall experienced in the lowlands.

Where run-off is slight much water percolates down through upland soils which become strongly acid and impoverished, supporting moorland or heathland vegetation. Podzolization is also widespread and not confined to very coarse-textured materials as in the lowlands. The combination of cold and wetness sometimes leads to the formation of hill peat, while prolonged waterlogging has caused extensive development of gley soils.

The steep sides of the deep valleys and the fault scarp bounding the west side of the Long Mynd are mainly covered by acid brown earths of the Batch Complex (steep phase). These soils are shallow, stony and well drained, commonly being interspersed by rock outcrops. Deeper stony soils are found on the gentler lower slopes. Similar soils are found on the lithologically similar rocks of the steep slopes of the Brown Clee and the ridges of Caer Caradoc, Hope Bowdler, Lawley and the Wrekin. These rocks differ greatly in age, but are mostly hard and weather to produce well drained or silty soils. Where these areas are grazed by sheep the development of scrub is largely prevented and bracken/grassland frequently occurs.

Figure 3.15 shows a section through the Ercall, near Telford. Here podzols occur above strongly acid, coarse-grained rocks, whether igneous (granophyre) or sedimentary (Cambrian quartzite), and brown earths on the more base-rich, finer grained rocks. This is a fascinating area where variations in soil type, slope and water regime result in a complex pattern of soil types. As calcareous soils occur in Limekiln Wood, just over a kilometre away, all the major soil types of Shropshire are represented within two square kilometres. Detailed records of woodland vegetation on these soils are given in Table 7.3, in which eight of the stands listed are from the Ercall or its immediate neighbourhood (see Chapter 7).

Table 3.4 *Soil horizon notation*

	Organic surface horizons:
L	Plant litter, only slightly comminuted.
F	Comminuted litter.
H	Well decomposed humus with little mineral matter.
O	Peat, formed under waterlogged conditions
	Organo-mineral surface horizons:
A	Dark brown, mainly mineral layer with humus admixture.
Ap	Ploughed layer.
	Eluvial horizons that have lost clay and/or iron and aluminium:
Ea	Bleached or pale horizon which has lost iron and/or aluminium.
Eb	Relatively pale brown friable horizon which has lost some clay.
	Illuvial horizons enriched in clay or humus or iron and aluminium:
Bt	Horizon enriched in clay.
Bh	Dark brown or black horizon, enriched in humus.
Bs	Diffuse orange or red-brown horizon, enriched in iron and/or aluminium.
Bf	Thin iron pan
	Other subsoil horizons:
Bw	Weathered subsoil material, not appreciably enriched in clay, humus or iron, distinguished from overlying and underlying horizons by colour or structure or both.
C	Little-altered parent material.
Notes:	
g	The addition of 'g' denotes mottling or greying thought to be caused by waterlogging.
ca	The addition of 'ca' denotes the presence of secondary calcium carbonate.
A/(B), Bt/C, etc.	Transitional horizons are indicated in this manner.

Mull is a characteristic A horizon, which may be covered by a thin L horizon, but F and H horizons are scanty or absent. Mull humus is well incorporated into the soil and is rich in nitrogen, having a low C/N ratio (often about 10). It has passed at least once through the gut of one of the larger soil animals, while most mor and moder has not.

Moder characteristically has an H horizon thicker than the L and F combined.

Hydromorphic moder (Duchaufour, 1960) is a type of moder which is greasy, often plastic, partly formed in anaerobic conditions.

Mor (raw humus) has thick L and F layers, is acid and low in nitrogen (C/N ratio c. 20).

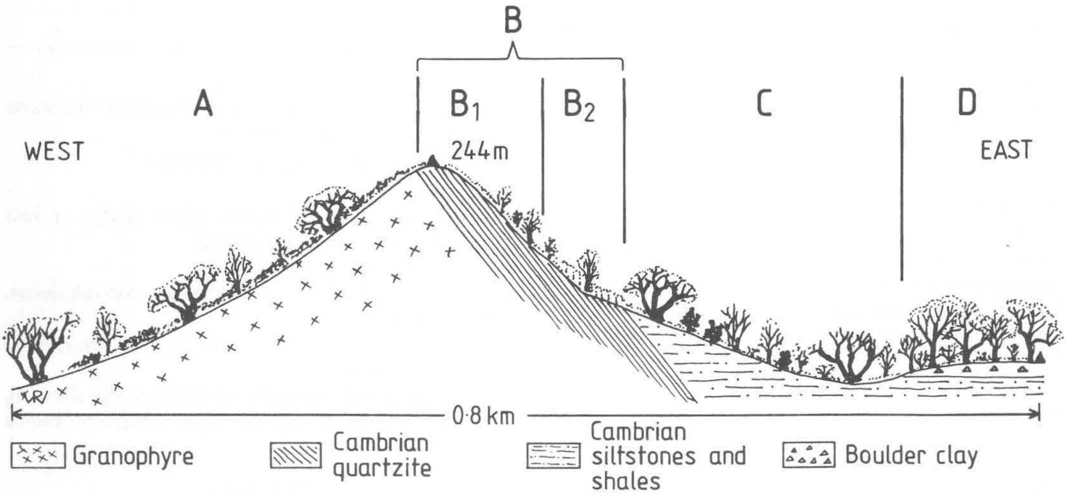
(*Modified from Burnham and Mackney (1964), by courtesy of the Field Studies Council.*)

Table 3.5 *Soil Groups important in Shropshire*

Major group	Group
Lithomorphic soils Shallow AC profiles.	*Rendzinas* Soil at least partly calcareous, over limestone (or (or debris), with base-rich mull. *Rankers* Non-calcareous, over hard rock.
Brown soils Profiles with a Bw or Bt horizon, without distinct greyish or mottled colours due to reduction within 40cm of surface, usually with acid mull or moder (except brown calcareous earths). Gleyic subgroups have greyish or mottled colours starting between 40 and 80cm depth and/or faint mottles within 40cm.	*Brown calcareous earths* Loamy ABwC profile, at least partly calcareous, with base-rich mull. *Brown sands* Sandy, non-calcareous. *Brown earths* Loamy (rarely clayey), non-calcareous, ABwC profiles. *Argillic brown earths* Loamy or loamy over clayey, ABtC or AEbBtC profiles. *Brown alluvial soil* In loamy or clayey recent alluvium, non-calcareous to 40 cm or more (otherwise brown calcareous alluvial soils).
Podzolic soils Profiles with Bh, Bs and/or Bf.	*Brown podzolic soils* ABsC profile (no 0, Ea, Bf, Bh or Bg horizon), usually with moder or mor. *Podzols* Profile (usually with mor) has an Ea horizon either with Bh only (humus podzol), Bs only (ferric podzol) or both (humo-ferric podzol). *Gley-podzols* Have Ea Bh Cg or Ea Bh (Bs) Bsg Cg profiles with mor or thin peat. The Ea may be indistinct. *Stagnopodzols* Have Eag and/or Bf horizons, usually under peaty humus.
Surface water gley soils Have no Bh, Bs or Bf horizon. Distinct grey or mottled colours are present within 40cm of the surface and soils are on slowly permeable substrata (but not recent alluvium).	*Stagnogley soils* Have normal mull humus. *Stagnohumic gley soils* Are humose or peaty at the surface.
Ground water gley soils Have no Bh, Bs or Bf horizon. Distinct grey or mottled colours are present within 40cm of the surface and soils are on permeable substrate or any recent alluvium.	*Alluvial gley soils* Are on recent alluvium and have mull. *Humic-alluvial gley soils* As previous, but humose or peaty at the surface. *Sandy gley soils* Other ground water gley soils with sandy texture, mull and no Bt or Btg. *Humic-sandy gley soils* As previous, but humose or peaty at the surface. *Argillic gley soils* Have mull and a Bt or Btg horizon. *Cambic gley soils* Non-alluvial ground water gley soils with mull, loamy texture and no Bt or Btg horizon. *Humic gley soils* Non-alluvial, loamy ground-water gley. Soils which are humose or peaty at the surface.
Peat soils Have more than 40cm of O horizon within the top 80 cm (excluding fresh litter or living moss).	*Raw peat soils* Fibrous (when wet little or no peat squeezes through the hand). *Earthy peat soils* Well decomposed (most squeezes through hand).

Note

The nomenclature above follows Avery (1980), where full definitions are given. Other names are used informally, e.g. calcareous soils for brown calcareous earths and/or rendzinas, *gley soils* for surface-water and ground water gleys and *alluvial soils* for brown alluvial soils, alluvial gley soils and others formed on Holocene alluvium.



	Soils	Vegetation	pH	
			Topsoil	Subsoil
A	Podzols and brown podzolic soils	Oak-birch coppice; heather, bilberry, bracken or wavy hair grass locally dominant. The mosses *Leucobryum glaucum* and *Plagiothecium undulatum* are conspicuous	3.9	4.5
B_1	Humo-ferric podzols and podzolic rankers	Bracken, some birch scrub and heather	3.7	4.4
B_2	Gley-podzols	Bracken, some birch and bluebell	3.8	4.6
C	Typical brown earths	Oak-birch coppice, with rowan and holly, very variable field layer including male fern, ivy, honeysuckle, bluebell, bramble, creeping soft-grass, wood sorrel, yellow archangel	4.1	4.3
D	Gleyic argillic brown earths	Mixed deciduous woodland with ash, birch, elm *(Ulmus glabra)* and alder, with hazel, hawthorn (*Crataegus monogyna*), oak and ash regenerating; field layer includes dog's mercury, enchanter's nightshade, male fern, tufted hair grass, wood sanicle.	5.2	5.7

Fig. 3.15 *Soil-vegetation relationships of the Ercall. Leaching has decreased the pH of the topsoils. (Redrawn from Burnham and Mackney 1964, by courtesy of the Field Studies Council.)*

3.5 Land Use

The present **cultural landscape** of the Shropshire Region is the product of interaction between people and their environment since Palaeolithic times. The spacing between villages and hamlets, as a glance at the map will show, varies from area to area within the region. Real settlement patterns seldom fit the 'ideal' models of theoretical geography (see Job and Jarman 1980), being distorted by variations in physical constraints from area to area and especially the patchiness of vegetation and soils (see Chapter 9). Early settlers found some areas attractive because the ground could be readily cleared and cultivated or grazed, while others were too thickly wooded, ill-drained or exposed. The New Stone Age saw the first efforts to clear considerable areas of mixed oak forest and to replace it by pasture and cropland. A more detailed understanding of these problems, and the resulting patterns, involves reference to the 1:250 000 soil maps published by the Soil Survey of England and Wales in 1983 (see section 3.4).

Analysis of these maps in Shropshire indicates that Brown Earths (541), for example the Bromsgrove, Eardiston and Munslow series, and Brown Sands (551) of the Bridgnorth and Newport series, derived from both solid and drift deposits, represented the most favoured sites for early settlement and sedentary agriculture. A high proportion of settlements in north and east Shropshire are on dry-point sites—sandstone, sands and gravels or terrace deposits. From such strongly nucleated settlements as Claverley, Beckbury and Worfield in east Shropshire came new settlement in the surrounding woodland and waste. Many of the resulting small hamlets or farmsteads remain today. Former heathland on less fertile soils (arid gravelly sands and pebble beds, humo-ferric podzols 631: Delamere and Crannymoor series for example) were finally enclosed in the late eighteenth and early nineteenth centuries by Act of Parliament.

Plymley wrote in 1803 "there are several large commons on the road from Shrewsbury to Drayton; these are of much inferior value but still capable of being made profitable: on the very worst parts of them the Scotch fir would thrive". After the Norman Conquest more than half the county had been brought under Forest Law as Royal Forest, with hunting rights reserved to the crown. The composite 'Forest of Shropshire' includes not only areas of ancient woodland (e.g. Morfe, Wyre), but also extensive tracts of upland heath (e.g. Clees, Stiperstones). Forest law proved impossible to administer over such a vast and diversified territory and broke down in local situations (Rowley 1972). The ancient Forest of Morfe in east Shropshire suffered much from illegal clearance and degenerated early into waste (Yates 1965); it is however an example of late enclosure (1805) whose large rectilinear fields stand out in marked contrast to the small irregular fields remaining around the older nucleated settlements.

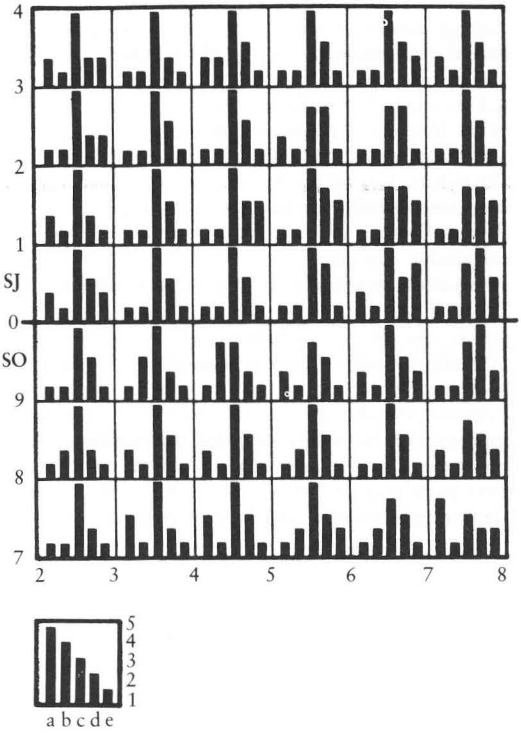


Fig. 3.16 *Land-use in the early 1960s in the 42 10km squares of the Shropshire Rectangle. The height of each vertical bar represents the proportion of the land in that square given over to the type of use indicated. The general preponderance of improved grassland is challenged by arable in parts of the east and north-east, and by woodland in the extreme south-east. With acknowledgements to the Second Land Utilization Survey for access to unpublished arable and grassland data.*

a Woodland and plantations
b Moor, heath, rough grazing
c Improved grassland
d Arable
e Urban and industrial, including roads, railways, quarries and mines

5 > 50% of area
4 25–50% of area
3 10–24% of area
2 5–9% of area
1 < 5% of area

Sedentary agriculture transformed the natural ecosystems particularly through the use of the plough; a distinct ploughed topsoil, the Ap horizon, is still evident in most lowland soil profiles, even those under areas of apparently old mixed woodland. Rare exceptions to this are seen in the genuine primary woods at Old Wood near Merrington and at Preston Springs near Lee Brockhurst (Burnham and Mackney, pers. comm.). Woodland adjacent to settlements was utilised for coppicing and swine pasturage (pannage) so that the natural succession was altered. Deflected secondary succession occurred on abandoned arable land; many areas of *Calluna* heath probably developed on exhausted soils where natural regeneration was impeded by grazing animals. The amounts of soil organic matter gradually declined on arable land; on sloping sites erosion and soil degradation resulted in partial truncation, removing the topmost layers of some soils on the upper and middle slopes, and redepositing them (colluviation) on lower slopes and valley bottoms. Further modification of natural soils, particularly the coarser-textured soils in east Shropshire, was caused by marling — a practice which improved crumb structure and moisture capacity by the application of heavy dressings of more-or-less calcareous clay (marl). The resulting marl pits are a conspicuous feature of the boulder-clay areas on the 2½ inch maps (e.g. SJ 43 and 53). The few which now survive are often of considerable botanical interest, with a flora similar to that of disused stretches of canal (see Chapter 5).

As we have already seen, the River Severn forms an approximate boundary between the northern plain and the hills and uplands of south Shropshire. Each of these main regions can be sub-divided. The northern plain terminates in an upland area west of Oswestry. To the east and south the lowland skirts the Uriconian area of the Wrekin and the Dawley-Tettenhall plateau to join the east Shropshire lowland. South Shropshire can be usefully divided into the West Central Hills and the Clun Forest area which is separated from the Clee Hill platform by a belt of Scarplands and vales.

The northern plain is characterised by a complex pattern of glacial drift which is locally broken by outcrops of sandstone, as between Nesscliff and Hawkstone. The meres and mosses lie in a crescent of hummocky morainic ground in the western part of the plain. Imperfect and poorly drained soils (stagnogley soils 711) of the Salop and Clifton series are widespread and much of this area would have been thickly wooded. Areas of humic sandy gley soils (Isleham series 2.861), peat-filled depressions and alluvial gley soils would have presented unattractive sites for early settlement. Today these parts of the plain are mainly given over to grazing and have many isolated farmsteads and small hamlets. Much of the area was settled rather late when population pressure had increased and drainage methods improved.

South of the Severn the landscape is very varied with tracts of high upland. Brown Clee (540m), Titterstone Clee (533m), the Long Mynd (517m), the Caradoc Hills and the Stiperstones (537m) overlook wooded escarpments, beautiful vales and lower plateaux. The lowland vales are drift-filled and have extensive terrace and alluvial deposits.

On the Long Mynd there are extensive areas of shallow stony soils (Podzolic soils; Whithnell series 611), while slopes steeper than 20° characterise the east-facing valleys or batches. Welsh mountain sheep and a few ponies graze land which is largely held in common and includes large tracts of heather moor. In the Shropshire uplands over-grazing by sheep has degraded pastures and reduced soil fertility, nutrients being removed in the form of cropped sheep. Heather-burning also modifies upland soils and can lead to soil erosion. Over-grazing and poor management can lead to encroachment of bracken and rushes on improved pastures. Tourists now flock to the Long Mynd by car and a number of popular sites are badly trampled.

Grazing is extensive on the common lands of the Titterstone and Brown Clees. Shallow stony soils support both bracken and a bent-fescue (*Agrostis capillaris-Festuca ovina*) community. Quarrying of Dhu stone (dolerite) still continues on Titterstone Clee, while areas of disturbed soils have resulted from coal mining on Brown Clee and Catherton Common. Imperfectly and poorly drained soils of the Clee platform (typical stagnogley soils 711 of the Salop, Clifton and Claverley series) were formerly well wooded, and even today vestiges of woodland occur as elongated strips along the outcrop of the *Psammosteus* Limestone which marks the steep edge of the platform. A high proportion of the land is permanent pasture with sheep and store cattle being important. Estate woodland and parkland cover large areas of the eastern side of the Clee Platform.

The valleys, vales and lower slopes exhibit a very different land use pattern with dairy farming, store cattle and sheep being important 'traditional' enterprises. In the post-war period newer enterprises have emerged, for instance in Corve Dale, concentrating on cereal growing on better drained sites. Areas of old pasture have been ploughed up and fields enlarged through amalgamation, with the consequent loss of many miles of hedgerow.

Parts of the uplands, notably in the Clun Forest area and on the Long Mountain where the traditional stock-rearing farm units were already large, have enjoyed the benefits of hill-farming subsidies and EEC incentives for Less Favoured Areas. They are extensively converted to arable use, even on the higher ground. Elsewhere in the hill country, for instance around Shelve and Pennerley, smallholder farming has persisted until very recently, having originated as a subsistence economy linked with the fluctuating fortunes of lead-mining.

Agriculture is the greatest user of land in the region and centuries of agricultural development have impressed a distinctive cultural pattern on the landscape. Ironically modern agriculture in the post-war period has made a greater impact on the landscape in four decades than the previous 200 years.

In those areas of the county where soils and landform favour intensive arable farming (lower Severn valley and the north-eastern plain), post-war agriculture has undergone significant changes. The growth of mechanisation brought in its wake the need for larger field units with the consequent loss of many trees and much attractive habitat. Although the impact of these changes has not been as devastating as in parts of east and southern England, the former 'bocage' landscape of parts of east Shropshire, which had similarities to that near Caen (Normandy), has undergone locally significant changes through a combination of hedgerow removal and Dutch elm disease. Hedgerows are a particularly interesting feature of the landscape because they are man-made.

In some parts of Britain attempts have been made to date them by the range of species they contain, though this approach is not successful in Shropshire where it seems that many different available species were used to set the hedge (see also 7.9).

> "I enclosed a small common a few years ago, without the expense of posts and rails. When the line of fence was marked out, a trench was dug of considerable width and depth. Strong bushes of hazle, willow, hawthorn or whatever could be met with in a neighbouring wood, were planted in this trench" (Plymley 1803).

Field boundaries often demarcated soils with different management properties and where field amalgamation has taken in two or more former fields with different soil textures (say sandy loam and clay loam) management difficulties arise in modern cultivations.

One very important aspect of hedgerow removal which tends to be overlooked in arable areas is the increased risk of soil erosion by wind and water. Research in the West Midlands over the last two decades reveals a significant increase in sheet, rill and gully erosion in the intensive arable areas. Wind erosion is also widespread on light sandy and peaty soils (Reed 1979), and has been considerably increased by the hedgerow removal already referred to. Soil compaction caused by the use of heavy machinery and the reduction of soil organic matter (often to below 2%) are further recent trends. Whereas this is not the place to discuss the wider implications and social costs of these changes, it should be noted that parts of some tributary valleys have received great quantities of sediment in the last 50–80 years. Areas marked as quality meadow on the 1914–18 wartime land use maps are today covered with almost impenetrable willow-alder thicket.

Lush growths of weeds supported by nutrient enrichment infest the shallows and margins of watercourses, and in places thick deposits of transported material (sands, loamy sands and gravel) overtop soil profiles. Steeper slopes can now be ploughed by powerful four-wheel-drive tractors, and 'banky' fields hitherto in rough grazing or permanent pasture are being brought into arable use. The risk of soil erosion on these steeper slopes is thus greatly increased. Large areas of poorly-drained soils and wet lands are being improved for more productive use.

On Whixall-Fenn's Moss, in the north of the region, peat-cutting still survives as a small-scale industry though long since converted from a commoners' right (of turbary) to allotments or to leasehold exploitation. Many of the peat hollows have already been drained. Work undertaken by the Duke of Sutherland in the Weald Moors, and later completed in 1800 by the Commons Improvement Act brought a large area of peat and peat loam soils into productive use. Oxidation and shrinkage of the peat have been problems which are today exacerbated by the risk of wind erosion where fields have been enlarged and exposure increased. These are highly productive soils if managed with care and not subjected to continuous arable production.

Barley, wheat, sugar beet and potatoes are the principal crops grown, together with feed crops where stock form part of the arable enterprise. A recent colourful addition to the arable scene is oil-seed rape, whose bright yellow flowers are now seen throughout the arable areas of the county. With the growth of intensive arable has come the need for water to irrigate crops, and irrigation ponds have become more numerous.

Though the Shropshire Region remains essentially rural with a landscape dominated by farms, woodland and copses, an urban industrial landscape has developed in the east on the Dawley coalfield and is now centred on the expanding New Town of Telford. Elsewhere in the county industrial land use is associated with the larger settlements of Shrewsbury and Bridgnorth.

Land which is agriculturally unproductive covers a wide range of uses from settlements, communications, quarries and dumps to military and industrial land. Other than in the Telford area, coal has also been mined on Brown Clee, Catherton Common and at Highley, as well as in the Oswestry and Great Hanwood areas. There were lead mines in the West Central Hills from Roman times until the first half of the twentieth century, diversifying in the latter years by the production of zinc and copper ores and of barytes. Quarries for road metal and lime are scattered throughout the region. Of great interest here is the recolonisation of abandoned workings by a variety of plant species; it is unfortunate that rock outcrops of the highest botanical interest (e.g. Craig Breidden) often coincide with rock types of the greatest commercial value, but the quarrying industry today is increasingly sensitive to the needs of conservation (Sinker 1970). Modern planning controls ensure proper reinstatement of land used for extractive industry, and a number of open-cast workings, clay pits and sand gravel workings have now been returned to agricultural, woodland or recreational use. Several disused quarries in which important geological features are exposed are managed as nature reserves by the STNC, and two former limestone quarries, Llanymynech Rocks and Dolgoch Quarry, are conserved primarily for botanical reasons.

Nowhere has readjustment taken place more successfully than on some of the spoil heaps in and around Telford New Town. Many of these heaps have been reworked; in other places the sites of former bell mines have been open-casted. There have, unfortunately, also been instances where interesting tip vegetation has been destroyed for the sake of uniformity or excessive tidiness. In planning the 'improvement' of former mine sites, the authorities should bear in mind a number of important constraints, especially the nature of the mineral matter making up the spoil and whether it has toxic properties when exposed to the air. Slope aspect and drainage are also very important.

Much of the spoil in the Telford area is derived from glacial drift and Coal Measure material.

In general the soils are very shallow (raw soils with compacted and very stony subsurface horizons). A dense organic mat frequently overlies a mainly mineral horizon which shows little sign of pedological modification, but with care such soils can be used to create amenity areas. Gorse (*Ulex europaeus*), rushes, bracken, birch and heather are prominent in much of the vegetation. Maturing stands of pine and birch occur on older spoil which may have been tipped a hundred years ago; there are places where senescent birch is gradually dying out and being supplanted by various longer-lived species including oak and sycamore. Derelict mining areas which have reverted to the 'wild' have a valuable part to play in urban amenity and recreation, but areas near to housing developments inevitably suffer from trampling and casual rubbish-dumping.

The flatter countryside of north and east Shropshire has proved suitable terrain for the establishment of a considerable number of military camps and airfields. Most of these are now redundant and in many cases their extensive ground has been reinstated for agricultural use e.g. Prees Heath. The empty buildings of many are now put to other uses such as grain stores or light industry (Stanmore Camp, Bridgnorth). Their extensive nature and the necessary restrictions on other uses often mean that the perimeters of these Ministry of Defence lands have included considerable tracts of semi-natural vegetation, pockets of which still remain when camps become redundant. Again, within those camps still operating, there are many areas of 'wild' land which enjoy a perverse type of enforced under-use, thereby providing a safe haven for plants and animals.

SOILS, EXPOSURE AND FOREST PRACTICE

The woodlands of Shropshire occur mainly on hill slopes (see Chapter 7), often on soils unsuitable for agriculture. Most recent plantings have involved the use of softwoods; conifers usually grow very much faster than broadleaved deciduous trees, tending to do better on the more acid soils than such species as beech (*Fagus sylvatica*) and pedunculate oak (*Quercus robur*). The southern beeches (*Nothofagus* spp.), now becoming more popular, are something of an exception as deciduous species such as raoul (*N.procera*) grow rapidly on quite acid soils, form mull humus and encourage a far richer herb layer than would develop under plantations of pine or spruce (Wigston 1983). *N. procera* is, however, sensitive to severe frosts such as those of 1981–2. Choice of tree species is dictated by the soil, the market value of the timber, rate of growth, and by climate (rainfall, exposure to wind, frost and average summer temperature). The soil memoirs for Church Stretton (Mackney and Burnham 1966), and particularly for Ludlow (Hodgson 1972), give details of the suitability of various tree species for particular soils and sites.

Remnants of native woodland still survive, usually after many centuries of management. Such woods consist of sessile and pedunculate oak, ash, wych elm (now gradually diminishing), birch, holly and hazel, with smaller amounts of field maple, aspen, lime and wild cherry (*Prunus avium*). Selected strains of top quality oak, ash and beech can still be grown economically on sheltered sites with base rich soils. Douglas fir *Pseudotsuga menziesii*, Scots pine (*Pinus sylvestris*) and European larch (*Larix decidua*) planted in the **Hope Valley** nature reserve before it was purchased for nature conservation are now being removed. Stools of sessile oak left when the woodland was felled are sprouting vigorously; this ancient woodland may be saved at the last moment. Mixtures of conifers with oak, beech, sycamore, ash or sweet chestnut are quite often planted. If Norway spruce (*Picea abies*), European larch or Western red cedar (*Thuja plicata*) are used in such even aged mixtures the financial value of early thinnings is greatly increased. In much of the Wyre Forest recent policy has been to create a diversity of conifers with relatively small patches of Scots pine, Norway spruce, Western red cedar, Douglas fir, Western hemlock (*Tsuga heterophylla*) and a little grand fir (*Abies grandis*). These exist alongside beech, native oaks, sycamore, yew, holly, wild cherry and alder in a productive forest of high conservation value.

In many places, however, even aged plantation monocultures are not uncommon. Pines, which encourage the development of an acidic mor humus, are important in drier areas with Corsican pine (*Pinus nigra*), on the lower slopes, Scots pine on the middle and upper slopes, and lodgepole pine (*P. contorta*) in very exposed sites. The larger exotic conifers from the Pacific Northwest states of the U.S.A. produce the largest yields. Western hemlock, Douglas fir and Sitka spruce can be highly productive, although the latter two species become liable to windthrow as they mature. Douglas fir does best on deeper soils, while Sitka spruce (*Picea sitchensis*) requires high rainfall to do well. Viewed as a whole, the patterns of forest planting now developing are in many cases more sympathetic to landscape and conservation interests than those used in the early days of the Forestry Commission. However, in many planted woodlands the most ecologically interesting areas are those where the trees are doing least well.

3.6 People, places and environmental profiles

The previous sections of this chapter have given some indication of the rich and complex local variations in geology, relief, drainage, microclimate, soil type and land use to be found in the region. The more subtle impacts of local history and the vagaries of human behaviour on the Shropshire landscape have barely been hinted at.

> "The inhabitants of Myddle Castle were plentyfully furnished with fresh fish out off the waters within the Lordship. And first Haremeare yielded great plenty of silver coulerd eles, beeside an abundance of other fish. When Myddle Castle was gon to ruine, soe that it was unhabitable, the Meare was leased by Will. Earle of Darby, unto Sir Andrew Corbett, of Morton Corbett, and to Mr. Kelton, of Withyford.
>
> "Haremeare Mosse was incompassed round with the water of this Meare; howbeit, the neighbours did gett some *turves* upon it, which they carryed over the water in boats; butt Sir Andrew Corbett caused a large causey, or banke, to bee raised throw the water, soe that teames and carts might easily passe from Haremeare Heath to the Mosse, and the turves, (which beefore were had freely,) were sold att 8d. a yard, that is, 80 square yards, to cutt and lay upon, which yielded a loade for the best teame thatt was.
>
> "Afterward, Sir Andrew Corbett and Mr. Kelton caused this Meare to bee loosed and made dry, and converted it to meadow and pasture."
>
> Richard Gough 1635–1723

How many people today are aware that Harmerhill took its name from a lost—or, rather, 'loosed'—mere? This invaluable fragment of mid-17th century ecological information comes from *The History of Myddle* by Richard Gough (1875, 1981), whose pithy anecdotes show just how big a part character, aptitude, energy and whim can play in shaping the signatures we leave upon our own little pages of landscape history. The biological consequences of a farmer's decision to lay and trim, to neglect, or to remove his hedges may be just as significant and long-lasting as those of a local authority to grant, to refuse, or to revoke planning consent for the working of a quarry.

The latest published figures (*Shropshire Star*, 1 March 1984) show the population of the county of Shropshire to be nearly 387,000. The county itself fills roughly 35 10km × 10km squares of the National Grid; the 'Shropshire Region' used in this book occupies 42 whole squares and several part squares, amounting to a total of 1100 **tetrads**: the tetrad, which is the basic unit of area for presenting the plant records (see Chapters 1 and 10), is a 2km × 2km square, 400ha or approximately 1000 acres in extent.

The average population density for the county, then, is c.11,000 per 10km × 10km square or 440 per tetrad. These averages are not very informative, however, because just over half the total population is concentrated in the towns of Shrewsbury (Shrewsbury and Atcham District: 90,100) and Telford (Wrekin District: 127,400): most of the former in five tetrads of two larger squares, and of the latter in about 20 tetrads of four larger squares. When a dozen smaller towns varying in size from Bridgnorth to Bishop's Castle are also excluded, we arrive at an estimate of *rural* population density of *c*100–150 per tetrad. This is quite high in comparison with both the mountainous areas of mid-Wales to the west and the arable plains of Lincolnshire and East Anglia, and it reflects the relatively small size and close spacing of farms and hamlets in the border landscape.

A typical tetrad in the North Shropshire plain might contain a small village or a couple of hamlets, parts of three or four medium-sized farms and several smallholdings, 3–8km of lanes and many more of hedges and ditches, as well as a small stream, some field ponds and a few hectares of mixed woodland used for game cover; the greater part of the area would be improved grassland or under the plough. A tetrad in the uplands would be likely to have the same basic components more sparsely distributed, but with less arable and some rough grazing.

Apart from the obvious major separation of the region into upland and lowland, it is possible to define and delimit smaller geographical subdivisions (see previous section and Chapter 3, Fig. 3.21) but not very profitable to do so. Plants, with which this book is chiefly concerned, have a habit of ignoring the nice boundaries of regional geography and turning up in pockets of suitable habitat untidily scattered through unsuitable territory.

It may, on the other hand, be useful to add a discriminating element to the generalities in the simple synoptic picture just presented of the 'typical tetrad'. For this purpose it is convenient to move up the scale to the 10km × 10km square, which is also more likely than not to include a river, several large villages, perhaps a small town, some main roads and a length of railway track (probably disused). The useful discriminants are those ecologically significant features which are of substantial extent or major importance in only a minority of the squares. A positive inventory of such features can provide a character sketch of the square, its **environmental profile**, which will help to account for the presence or absence of particular plant species or communities (Table 3.6).

Table 3.6 *Environmental profiles of the 42 10km × 10km squares in the Shropshire Rectangle*

A lower case letter indicates significant occurrence, a capital letter substantial extent or major importance for the feature represented. *Every letter refers to the square as a whole*: its local position is alphabetical, not geographical (i.e. not indicating the 'tetrad' in which it happens to be printed). The first line of letters in each square deals with relief; the second and third, with geology and hydrology; the fourth and fifth, with land use, including urban and industry.

	2	3	4	5	6	7
3	a B C – E f g – i k l – n – – q r s – U – W – y z	– – – d – F G – – k – – N – p q r s t – v w x y z	– – – – – F G – – – – M N o P q r – T – V w x – –	– – – – – f G – – k – m n – P – r – T – V w x – z	– – – – – f G h – k – – N – p – r – – – v w X y z	– – c – – f g H – k – m – – p Q r – t – v W x – –
2	– b C – E f g h I k L – – o p Q r S T U V w x y z	– – – d – F g H – – – – – O P q – s t – v w x y z	– – – – – f G h – – – m – – P – – s t – v w x – z	– – c d e f g H – k – – – – p q r s t – v w X y z	– – – d – f g h – – – – – – p q – – t – v w X y z	– – – – – f g h – k – m N o p – r s – – v w x – –
1	– b C d E f g – I – – – N O p Q r s t u v w x – –	– b c D e f G h I k – m N – p q r s t u v w X y –	– – – d – F G – – – – m N – – q r s t – v w X Y Z	– – – D e f g – i k – m n o – q – s – – v w X Y Z	– – c D – f g – i k – – – o P q r s t – v w X Y Z	– – c d – f g h – k l – – o p Q – – – – – w X Y z
0	– b C – e f g – i k – m N O p q r s t u v W x y z	a b C – E f g – i k – – – – p Q R s T U – w x y –	a b C – E F g – I k – m – – – q R s T u – w x y z	– – c D e F G – i k – m N – p q r s – – v w X – z	– b C d E f g – I K L – N o – Q R S T u – w x Y z	– – – d – f g h – k – – n – p q r s – – – w X Y Z
9	– b c – E f G – I k – – n – – q R s t U – w – – –	A B C – E f g – I k – – – – – q r s T U – w – – –	A B C – E f g – I k l – – – – q r s t U – w x y –	– b C – E f G – i K L – – – – q r S – u v w x – –	– – C – e f g – – K l – – – – Q r s – u v w x y –	– – – d – F g h – k – – N – p q R s – – – w X y z
8	A B c – E – – – – – – – – – – q r s – U – w x – –	– b C – E f g – i k – – – – – q r s t u v W x – –	– b C – E f g – i K l – – – – q r S t u v w x – z	a b C – e f g – i K l – – – – q r s – U – w X – –	– b C – e – – – i K l – – – – q r s – u v w x – –	– – – d – f – h i K – – N – – q R s – – v w X y –
7	a B c – E – – – – – – – – – – q r s – u – w x y –	a B C – E f g – – k – – – – – q r s – u v W x – –	– b C – E f g – – K l – – – – q r S t u v W x – –	a b c – e f g – i K l – n – – Q r s t U – w x y z	a b c – e – – – i K l – – – p q r s t U v w x – –	– – c d e f – – – k – – N – – q R s T – v W x y z

A	Altitude reaching over 1400ft in parts
B	Altitude between 1000 and 1400ft in parts
C	Altitude between 600 and 1000ft in parts
D	Altitude descending below 200ft in parts
E	Exposed, steep S- or N-facing hillsides
F	Fluvioglacial or terrace sands/gravels
G	Glacial moraine and boulder clay (till)
H	Hills on Triassic sandstone
I	Igneous, volcanic and Precambrian rocks
K	Keele, Keuper and other base-rich beds
L	Limestones with shallow soils
M	Meres
N	Navigable canals and large rivers
O	Overgrown canals, disused
P	Peatlands
Q	Quarries and mines
R	Ravine woods
S	Scarp woods
T	Trust reserves and other protected sites
U	Upland heath, moor and rough grazing
V	Valley and lowland mires and heath
W	Woods, planted coniferous
X	Extensive arable farms with large fields
Y	Industry and urban development
Z	Railway sidings, motorways, airfields

4 Biogeographical elements

Mistletoe (Viscum album) *on apple*

Introduction

J R Matthews, in a well-known paper in *Journal of Ecology* (1937) and a subsequent revision (Matthews 1955), recognised 16 different types of plant distribution within the British Isles, basing his analysis on their known distribution in the world. Using these types of distribution, or biogeographical elements, and confining the analysis to species which appear to be native, it is possible to make comparisons between the flora of one part of the country and the country as a whole and to place the local flora in its biogeographical position within the British Isles. In this chapter this is done for the Shropshire Region. Species previously recorded but now probably or certainly extinct are included.

These comparisons, however, have to be treated with caution. In preparing the lists for the Shropshire Region that follow this chapter (Table 4.2), advantage has been taken of recent research and publications, notably *Flora Europaea* (Tutin *et al* 1964–1980) and *Atlas Florae Europaeae* (Jalas and Suominen 1972 onwards), and the allocation of each species reconsidered; this has resulted in widespread revision of the categories including the merging of two of them. Species not listed by Matthews (1955) in the element to which they are allocated here are marked †† in Table 4.2. This revision has been taken into account when calculating the percentage of species in each of the elements in the British flora (see Table 4.1) only in so far as species that have been recorded within the Shropshire Region are concerned; it has not been extended to species that have not been found in our region. Re-examination of the whole British flora would result in some further adjustment of the percentage figures for the British Isles but would be unlikely to affect the implications drawn from the broad comparisons made in this chapter.

Geographical elements in the flora

1 WIDE ELEMENT

This element includes species with a wide distribution in Europe, Asia and North America, some of them extending to North Africa or even into the southern hemisphere. Despite the extent of their distribution outside the British Isles, they can have very different distribution patterns and frequencies within our region. Harebell occurs in every 10km square, whereas hairy rock-cress is known from only nine tetrads.

Campanula rotundifolia
Arabis hirsuta

2 EURASIAN ELEMENT

Various authors, including Matthews, have defined this element as including species found throughout Europe *and* Asia, often extending as far east as China;

they have also delineated a European Element embracing species found throughout Europe but including some not extending to the extreme north and east. In sifting the data now available it became apparent that very few plants are widespread in Europe but restricted to its somewhat artificial boundaries: species often extend through the Caucasus or the Urals into Asia. For this reason these two elements have been combined, and the Eurasian Element here includes all species which are widespread in Europe and Asia. With 384 species, this is by far the largest element in our local flora.

Again, despite their wide extent outside Britain, species of this element exhibit a variety of distribution patterns within the Shropshire Region. Field maple occurs throughout the area; kidney vetch, a species with a strong affinity for lime-rich soils, only occurs in 12 widely scattered tetrads; clustered bellflower has only ever been known wild from Wenlock Edge and near Ludlow and is now almost certainly extinct.

Acer campestre
Anthyllis vulneraria
Campanula glomerata

Most of the common native species of Shropshire belong to one of these first two elements but, as has been shown, a number of rare and local species are also included. The remaining elements are represented by much smaller numbers of species – in only two cases, Continental and Continental Northern, approaching 10% of the flora.

3 MEDITERRANEAN ELEMENT

These are species whose chief centre of distribution is in the Mediterranean Region, though with extensions through western France which occasionally reach the British Isles. A classic example is the strawberry-tree, a characteristic shrub of the maquis and similar sclerophyllous communities in bare, rocky country, with isolated localities in Brittany and in western Ireland — in Kerry, West Cork and Sligo.

Arbutus unedo

The majority of the 38 British species placed by Matthews in this element are found in the Channel Isles and in counties bordering the English Channel and some even in a few counties up the west coast. Not surprisingly Shropshire, being an inland county, has only one species in this group which could be regarded as a native — tall ramping-fumitory. It is a rare plant with only three recent records, significantly all from the western margin of our region. Even this species, a weed of arable fields and waste places apparently confined to roadside verges in our region, was probably introduced to Britain by early cultivators.

Fumaria bastardii

4 OCEANIC SOUTHERN ELEMENT

According to Matthews (1955) the main centre for species in this element is in the south and west of Europe. The majority grow under oceanic conditions and overlap the Mediterranean and Oceanic West European Elements. Using these criteria and the new information mentioned above, 21 species that are not listed by Matthews in this element and that occur in the Shropshire Region have been added. One species, common ramping-fumitory, included here by Matthews, has been transferred to the Oceanic West European Element and another, bristly oxtongue, to the Continental Southern Element.

Fumaria muralis
Picris echioides

The 33 species in this element recorded in our region represent about 3.8% of the native flora: this is considerably less than the 5.9% occurring in the British flora and doubtless reflects the relatively non-oceanic and northerly position of Shropshire in the British Isles.

One of the most characteristic species of this element is tutsan, whose distribution in our region almost perfectly reproduces its wider European pattern: nearly all the records are from south and west of a line joining Oswestry to the Wyre Forest. In contrast, thin-spiked wood-sedge is concentrated in the south-east of Shropshire between Bridgnorth, Bewdley and Ludlow. Twelve of the 33 species in this element (36%) are species that have been recorded from ten or fewer tetrads, including starfruit, which is now extinct in our region; only five are common, including holly and honeysuckle.

Hypericum androsaemum
Carex strigosa
Damasonium alisma
Ilex aquifolium, Lonicera periclymenum

5 OCEANIC WEST EUROPEAN ELEMENT

This element includes species almost confined to western Europe, occurring from the west of the Iberian peninsula, through the west of France, Britain and

Belgium up to the south-west coast of Scandinavia. The absence of these species from North Africa, with the exception of a few found in Morocco, emphasises the essentially 'Atlantic' nature of this element, which is often referred to as 'Lusitanian'. Sixteen species not assigned to it by Matthews have been added, bringing the total to 38 or 4.4% of the local flora. This compares with 6.4% in the flora of the British Isles as a whole – a further reflection of the relatively continental nature of our climate and the absence of any coastline.

A feature of this element in the Shropshire Region is the large number (24 out of 38 species) that occur in heath or acid wetland habitats, including such characteristic species as bell heather, cross-leaved heath, marsh St John's-wort and petty whin. The southern or western distribution of some members of this element in Shropshire is well demonstrated by creeping forget-me-not, lesser skullcap, hemlock water-dropwort and round-leaved crowfoot. Nearly a third (12) of this element are rare species recorded from ten or fewer tetrads, including the almost certainly extinct sea stork's-bill, hay-scented buckler-fern, toadflax-leaved St John's-wort and pillwort; only four species are common, including bluebell and barren strawberry.

Erica cinerea, E. tetralix, Hypericum elodes, Genista anglica

Myosotis secunda, Scutellaria minor, Oenanthe crocata, Ranunculus omiophyllus

Erodium maritimum, Dryopteris aemula, Hypericum linarifolium, Pilularia globulifera

Hyacinthoides non-scripta, Potentilla sterilis

6 CONTINENTAL SOUTHERN ELEMENT

This element contains species which are found mainly in southern and central Europe with their northern limit in northern Germany; nearly 60% occur in North Africa, which emphasises their southern affinities. Many are restricted to the southern half of Britain and reach their northern limit on a more or less east-to-west line across the country.

Twenty-six species not included by Matthews have been added, and one species, rough clover, has been transferred to Oceanic Southern. This brings the total number of species in this element in the Shropshire Region up to 64, which represent 7.5% of our native flora. This is less than the 9.8% in the flora of the British Isles: many southern species reach their northern limit in Britain to the south and east of Shropshire.

Trifolium scabrum

A notable feature of this element is the large number of species of dry open habitats, many of them annuals that favour south-facing aspects of our hills. Some, such as upright chickweed, are characteristic of rather acid rocks in the south and west, whilst others such as yellow-wort are calcicoles and are particularly frequent in the south-east. Over 40% (26) of this element are species that have been recorded from ten or fewer tetrads; five of these are extinct – white helleborine, opposite-leaved pondweed, hutchinsia, spreading hedge-parsley and narrow-fruited cornsalad – and there are no recently confirmed records for dense-flowered fumitory or narrow-leaved bird's-foot-trefoil.

Moenchia erecta

Blackstonia perfoliata

Cephalanthera damasonium, Groenlandia densa, Hornungia petraea, Torilis arvensis, Valerianella dentata

Fumaria densiflora, Lotus tenuis

7 CONTINENTAL ELEMENT

This element includes species which are characteristic of central Europe, though some extend westwards to the Atlantic coast and eastwards into Russia and Asia. It forms the third largest element in the flora of the Shropshire Region. The majority of its species are found in south-east England and reach their northern limit on a south-west to north-east line.

A very large number of species (60) not recognised by Matthews as of Continental distribution have been added, the majority taken from his European Element. Eight species have however been removed, including three which are Eurasian in distribution – wild onion, fine-leaved water-dropwort and zigzag clover. It was clearly difficult for Matthews, with limited information available, to separate widespread European species from those mainly confined to central Europe; this is another aspect of the problem outlined in the discussion of the Eurasian Element above. These changes bring the number of species in this element, excluding six microspecies of *Hieracium* subgenus *Hieracium*, to 85, 9.9% of the local flora – a slightly higher percentage than in the flora of the British Isles as a whole (8.6%), re-emphasising the closer relationship of our flora with the south and east of England than with the 'Atlantic' coast to the west.

Allium vineale, Oenanthe aquatica

Trifolium medium

This relationship is further emphasised by the distribution patterns of the rarer species of this element in the flora of the Shropshire Region. They comprise nearly half of the species in this element and many of them are found only in the south-east of the county, where the south-west to north-east limit across Britain just embraces the area between Ludlow and the Wyre Forest. The list includes wild liquorice, wood barley and lesser snapdragon. Several more widespread species show a similar tendency, particularly violet helleborine, green figwort, saw-wort and wild service-tree. This element includes only two common, widespread species – pedunculate oak and field rose.

Astragalus glycyphyllos, Hordelymus europaeus, Misopates orontium
Epipactis purpurata, Scrophularia umbrosa, Serratula tinctoria, Sorbus torminalis
Quercus robur, Rosa arvensis

8 CONTINENTAL NORTHERN ELEMENT

These are species whose range lies mainly in central and northern Europe. All occur in Scandinavia, where many extend beyond the Arctic Circle, and a large percentage are also found in Iceland. Thirty-two species not included by Matthews in this element have been added, but seven species have been transferred to other elements – soft-leaved sedge, water-violet and green figwort to Continental; opposite-leaved golden-saxifrage and trailing tormentil to Oceanic West European; many-stalked spike-rush to Oceanic Southern; and bilberry to Eurasian. This brings the total, excluding two microspecies of *Hieracium* subgenus *Hieracium*, to 82, 9.5% of our flora, which is higher than the percentage in the flora of the British Isles as a whole (7.6%). The majority of these 82 species grow in aquatic or wetland habitats such as marshes, fens and bogs; they include 15 species of *Carex* and three species each of *Callitriche*, *Drosera*, *Eriophorum* and *Potamogeton*.

Carex montana, Hottonia palustris, Scrophularia umbrosa
Chrysosplenium oppositifolium, Potentilla anglica
Eleocharis multicaulis, Vaccinium myrtillus

Many of the species in this element have northern distributions in Britain, but, though they reach their limit in Shropshire, the pattern within our region frequently fails to reproduce the national picture, largely because upland habitats to which some of these species are restricted are concentrated in the south and west of our region. Good examples of this phenomenon are one of the lady's-mantles and crowberry. In contrast, some species of lowland fens and acid peats – habitats concentrated in the northern half of the county – are confined to that area for edaphic as well as climatic reasons; notable examples are bog-rosemary, purple small-reed, elongated sedge, slender sedge, bog-sedge, and cowbane.

Alchemilla glabra, Empetrum nigrum
Andromeda polifolia, Calamagrostis canescens, Carex elongata, C. lasiocarpa, C. limosa, Cicuta virosa

With this high concentration of wetland species it is perhaps surprising that so few have yet become extinct: three are believed to have gone, but only one, Rannoch-rush, was a wetland plant. However, ten species in this element are known from only a single tetrad, so it may be one of the most endangered elements in the Shropshire flora. It is an element that contains only three common, widespread species – wild angelica, downy birch and sheep's-fescue.

Scheuchzeria palustris
Angelica sylvestris, Betula pubescens, Festuca ovina

9 NORTHERN-MONTANE ELEMENT

There are about 30 species in this element in the British flora; they have their main centre of distribution in northern Europe, frequently with extensions into the Subarctic, but in the south of their range they are restricted to mountains.

Two species placed by Matthews in this element have been transferred to others – mountain everlasting to Continental Northern and rock cinquefoil to Continental. However, one species, quillwort, has been added. All six species recorded in the Shropshire Region have decreased; indeed four are almost certainly extinct. Least water-lily is confined to one or two of the meres in the north of the county, and only globeflower occurs in any quantity, though confined to a small area in the north-west.

Antennaria dioica
Potentilla rupestris
Isoetes lacustris
Nuphar pumila
Trollius europaeus

It is difficult to understand why there should have been such a high percentage of extinctions in this essentially upland element, for its habitats have not been altered by man as much as some of the lowland areas. It may be significant that in nearby South Lancashire two of our four apparent extinctions, lesser twayblade and small-white orchid, are no longer found, whilst a third, stone bramble, has declined considerably. Perhaps climatic change has contributed to the reduction of this element in our region's flora.

Listera cordata, Pseudorchis albida, Rubus saxatilis

10 OCEANIC NORTHERN ELEMENT

This is a small element with its European headquarters in the north-west but with connections to north-eastern North America. Many of its species occur on or near the coast between north-western Spain and northern Norway, and it is thus not surprising that only seven of them have been recorded in the Shropshire Region, including a microspecies of *Hieracium* subgenus *Hieracium*.

Matthews placed 23 species in this element, but recent taxonomic work has led to the removal of wild thyme, previously given specific rank as *Thymus drucei*, to Continental Southern as it has now been reduced to a subspecies of *T. praecox*, and to the addition of four segregates or microspecies – *Epipactis phyllanthes*, *Euphrasia confusa*, *Hieracium anglicum* and *Sorbus rupicola*. These four taxa all have very restricted distributions in our region and each is known from only one or two localities. The hawkweed *H. anglicum* is at its southern limit in Britain, separated by almost 100 miles from its nearest localities in the northern Pennines, whilst the helleborine *E. phyllanthes* was first reported in 1967 and may be a new arrival. In contrast, water lobelia has become extinct here at the south-eastern limit of its distribution in Britain. Of the species in this element, only bog asphodel is still locally frequent. mainly in the hills of the south-west.

Thymus praecox ssp. *arcticus*
Lobelia dortmanna
Narthecium ossifragum

11 NORTH AMERICAN ELEMENT

This element includes species which occur on both sides of the North Atlantic but have a wider area of distribution in North America than in Europe. Only six species were placed in this group by Matthews and none of these occurs as a native in our region, though one has become established. This is slender rush, which is doubtfully native anywhere in the British Isles. It occurs on tracks and roadsides in about eight localities mainly around the Shropshire county boundary. A blue-eyed-grass, a recent introduction to these islands, became established at Llanymynech, also on the county boundary, but is now extinct. North American aliens clearly have difficulty in crossing the Shropshire frontier!

Juncus tenuis
Sisyrinchium montanum

12 ARCTIC-SUBARCTIC ELEMENT

This element comprises species which are exclusively northern in Europe. Although Matthews recognised 28 British species in this element, few occur outside Scotland and none is recorded from the Shropshire Region. One species, cloudberry, does however grow less than ten miles from our region, in the Berwyn Mountains to the west, where it is at its southern limit in Britain.

Rubus chamaemorus

13 ARCTIC-ALPINE ELEMENT

This element includes species which have a significant proportion of their distribution north of the tree-line in the Arctic and above the altitudinal limit of trees on high mountains further south. Although three of the 75 species placed in it by Matthews have been recorded in our region, two of these – crowberry and cowberry – now seem better placed in the Continental Northern Element. The third, alpine cinquefoil, was collected on Craig Breidden in 1871 but has perhaps long since disappeared.

Empetrum nigrum
Vaccinium vitis-idaea
Potentilla crantzii

14 ALPINE ELEMENT

These are species of the mountainous areas of west-central and south-east Europe which are absent from the north and from the Arctic. There are ten species in this element, none of which occurs in the Shropshire Region.

15 ENDEMIC ELEMENT

This element is made up of species which are not known outside the British Isles. The majority are in critical genera such as *Alchemilla*, *Euphrasia*, *Hieracium* and *Rubus*. They do not form a distinct element in the flora and are related to species of many different geographical distribution patterns. The exact number in the British Isles is uncertain, but in the Shropshire Region, excluding the genus *Rubus*, the total is at least eight (see Table 4.2). None of these is confined to our region, though H W Pugsley considered Shropshire to be the headquarters of the purple ramping-fumitory (Lloyd and Rutter 1957). Welsh ragwort has recently penetrated our region at Oswestry and Ludlow and near Chirk.

Fumaria purpurea
Senecio cambrensis

Table 4.1 *Allocation of 859 native species recorded in the Shropshire Region to 15 biogeographical elements adapted from those recognised by Matthews (1955), with comparative figures for the British Isles.*
The black histograms show the percentage of the 859 species that each of these numbers represents.
The white histograms show the percentage of the flora of the British Isles that the British species in each element represent; these figures have been partially adjusted from Matthews's figures, as explained in the text.
Matthews does not provide separate totals for his Wide, Eurasian and European Elements, so these are shown combined.
Microspecies of *Rubus fruticosus* agg. and of *Hieracium* subgenus *Hieracium* are omitted from these calculations, though the latter are included in the lists in Table 4.2.

Element	*Number of native species in Shropshire Region*	*Percentage of Shropshire Region's flora*	*Number of native species in British Isles*	*Percentage of flora of British Isles*
Wide	155	18.0	–	–
Eurasian	384	44.7	–	–
Wide and Eurasian	539	62.7	736	47.0
Mediterranean	1	0.1	38	2.4
Oceanic Southern	33	3.8	93	5.9
Oceanic West European	38	4.4	101	6.4
Continental Southern	64	7.5	154	9.8
Continental	85	9.9	134	8.6
Continental Northern	82	9.5	119	7.6
Northern-Montane	6	0.7	30	1.9
Oceanic Northern	6	0.7	25	1.6
North American	0	0	6	0.4
Arctic-Subarctic	0	0	28	1.8
Arctic-Alpine	1	0.1	73	4.7
Alpine	0	0	10	0.6
Endemic	4	0.5	20	1.3
Total	859		1567	

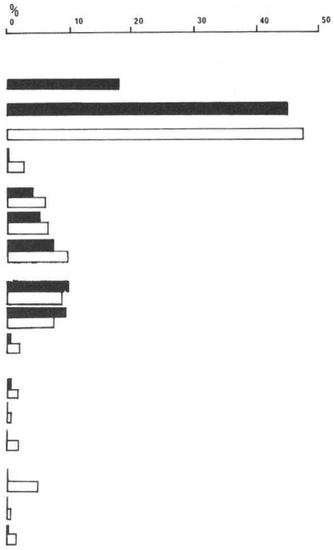


Table 4.2 *List of species recorded in the Shropshire Region assigned to biogeographical elements, omitting the two largest elements (Wide and Eurasian: 62.7% combined).*

Microspecies of *Hieracium* subgenus *Hieracium* are listed but excluded from the percentages.

Species not listed by Matthews (1955) in the element to which they are allocated here are marked ††.

Mediterranean Element (0.1%)
Fumaria bastardii

Oceanic Southern Element (3.8%)
†† *Alopecurus myosuroides*
Anagallis tenella
†† *Apium inundatum*
†† *Baldellia ranunculoides*
†† *Callitriche brutia*
C. obtusangula
Carduus tenuiflorus
†† *Carex muricata* ssp. *lamprocarpa*
†† *C. strigosa*
†† *Centaurea nigra*
Damasonium alisma (extinct)
†† *Digitalis purpurea*
†† *Eleocharis multicaulis*
†† *Galium saxatile*
†† *Hordeum secalinum*
Hypericum androsaemum
Ilex aquifolium
Iris foetidissima
†† *Kickxia elatine*
†† *Leontodon taraxacoides*
†† *Lonicera periclymenum*
†† *Ornithopus perpusillus*
†† *Orobanche rapum-genistae*
†† *Parietaria judaica*
Ranunculus parviflorus
Scrophularia auriculata
Sison amomum
†† *Stachys arvensis*
†† *Teucrium scorodonia*
Trifolium micranthum
†† *T. scabrum*
†† *Ulmus procera*
Umbilicus rupestris

Oceanic West European Element (4.4%)

Carex binervis
†† *C. laevigata*
†† *Cerastium diffusum*
†† *Chrysosplenium oppositifolium*
Cirsium dissectum
Conopodium majus
Corydalis claviculata
Dactylorhiza praetermissa
†† *D. purpurella*
†† *Dryopteris aemula* (extinct)
†† *Eleogiton fluitans*
Erica cinerea
E. tetralix
†† *Erodium maritimum* (extinct)
†† *Fumaria muralis*
Genista anglica
Hyacinthoides non-scripta
Hypericum elodes
†† *H. linarifolium* (extinct)
Lepidium heterophyllum
†† *Myosotis secunda*
†† *Narcissus pseudonarcissus*
Oenanthe crocata
†† *Pilularia globulifera* (extinct)
†† *Polygala serpyllifolia*
†† *Potentilla anglica*
†† *P. sterilis*
†† *Primula vulgaris*
Ranunculus hederaceus
R. omiophyllus
Salix cinerea ssp. *oleifolia*
Scutellaria minor
Sedum anglicum
S. forsteranum
Ulex europaeus
U. gallii
Vicia orobus
Wahlenbergia hederacea

Continental Southern Element (7.5%)

†† *Aira caryophyllea*
†† *Alisma lanceolatum*
Anacamptis pyramidalis
Apium nodiflorum
†† *Arenaria leptoclados*
Arum maculatum
Atropa belladonna
Blackstonia perfoliata
†† *Bromus commutatus*
†† *B. erectus*
†† *B. ramosus*
†† *B. sterilis*
Bryonia dioica
Calamintha ascendens
Carex pendula
Cephalanthera damasonium (extinct)
Clematis vitalba
Colchicum autumnale
Daphne laureola
Desmazeria rigida
Dipsacus fullonum
Euphorbia amygdaloides
†† *Filago vulgaris*
Fumaria capreolata
F. densiflora
†† *Galeopsis angustifolia*
†† *Galium cruciata*
†† *Groenlandia densa* (extinct)
†† *Hordeum murinum*
Hornungia petraea (extinct)
†† *Hypochoeris glabra*
†† *Juncus acutiflorus*
†† *J. subnodulosus*
Lotus tenuis
Mentha pulegium
†† *Mercurialis annua*
Minuartia hybrida
†† *Moenchia erecta*
Myrrhis odorata
Oenanthe lachenalii
Ophrys apifera
†† *Orchis morio*
Orobanche minor
Papaver argemone
†† *Picris echioides*
Plantago coronopus
†† *Pulicaria dysenterica*
Rosa micrantha
Salix purpurea
†† *Sanguisorba minor*
Silene gallica
Spiranthes spiralis
Tamus communis
†† *Thymus praecox* ssp. *arcticus*
Tilia platyphyllos
Torilis arvensis (extinct)
T. nodosa
Valerianella carinata
V. dentata (extinct)
†† *Veronica montana*
Vinca minor
†† *Viscum album*
†† *Vulpia bromoides*
†† *V. myuros*

Continental Element (9.9%)

†† *Alchemilla xanthochlora*
Anagallis minima (extinct)
†† *Aphanes arvensis*
Astragalus glycyphyllos
†† *Avenula pratensis*
†† *Bromus benekenii*
†† *Campanula glomerata*
†† *C. latifolia*
†† *C. patula*
†† *C. trachelium*
†† *Carex acutiformis*
†† *C. hostiana*
†† *C. montana*
†† *C. pseudocyperus*
†† *Chenopodium ficifolium*
Cirsium acaule
†† *C. eriophorum*
†† *Crepis biennis*
Cynoglossum officinale
Dianthus deltoides
Dipsacus pilosus
†† *Epipactis leptochila*
E. palustris
†† *E. purpurata*
†† *Euphrasia rostkoviana*
†† *Festuca altissima*
Gagea lutea
†† *Galium album*
Genista tinctoria
†† *Gentiana pneumonanthe*
†† *Glyceria declinata*
†† *Hieracium acuminatum*
†† *H. diaphanum*
†† *H. lasiophyllum*
†† *H. peleteranum*
†† *H. perpropinquum*
†† *H. salticola*
†† *H. subcrassum* (extinct)
†† *Hordelymus europaeus*
†† *Hottonia palustris*
Hypericum montanum
†† *Impatiens noli-tangere*
Inula conyza
Lamiastrum galeobdolon
†† *Luronium natans*
†† *Luzula sylvatica*
Misopates orontium
†† *Myosotis sylvatica*
Myosurus minimus
†† *Nepeta cataria*
Ophrys insectifera (extinct)
Orchis ustulata (extinct)
†† *Pedicularis sylvatica*
Polygonum minus
P. mite
†† *Populus nigra*
†† *Potamogeton coloratus* (extinct)
†† *Potentilla rupestris*
†† *P. tabernaemontani*
Quercus petraea
Q. robur
Ranunculus lingua
†† *Rosa arvensis*
†† *R. obtusifolia*
R. pimpinellifolia
R. rubiginosa
†† *R. sherardii*
Rumex hydrolapathum
†† *R. maritimus*
†† *R. palustris*
†† *Salix repens*
†† *S. viminalis*

†† *Scabiosa columbaria*
†† *Scrophularia umbrosa*
†† *Senecio erucifolius*
†† *S. viscosus*
Serratula tinctoria
Silaum silaus
†† *Sium latifolium* (extinct)
Sorbus torminalis
†† *Stellaria neglecta*
S. pallida
Symphytum tuberosum
Teesdalia nudicaulis
†† *Tilia cordata*
†† *Trifolium striatum*
†† *Ulmus minor*
†† *Valeriana dioica*
†† *Verbascum lychnitis* (extinct)
†† *V. nigrum*
Veronica spicata ssp. *hybrida*

Continental Northern Element (9.5%)

†† *Achillea ptarmica*
Alchemilla filicaulis ssp. *vestita*
A. glabra
Andromeda polifolia
Angelica sylvestris
†† *Antennaria dioica*
†† *Avenula pubescens*
†† *Barbarea stricta*
Betula pubescens
†† *Calamagrostis canescens*
†† *Callitriche hamulata*
†† *C. hermaphroditica*
†† *C. platycarpa*
Carex curta
†† *C. demissa*
C. diandra
†† *C. digitata*
C. dioica
C. disticha
C. echinata
C. elongata
C. lasiocarpa
†† *C. lepidocarpa*
C. limosa
†† *C. paniculata*
C. pulicaris
†† *C. spicata*
†† *C. vesicaria*
Cicuta virosa
Circaea × intermedia
Coeloglossum viride
Crepis paludosa
†† *Dactylorhiza fuchsii*
Drosera anglica
D. intermedia
D. rotundifolia
Eleocharis quinqueflora
†† *Empetrum nigrum*
Epipogium aphyllum (extinct)
Eriophorum angustifolium
E. latifolium
E. vaginatum
†† *Euphrasia brevipila*
†† *E. micrantha*
†† *E. nemorosa*
†† *Festuca ovina*
†† *Galeopsis speciosa*
Galium uliginosum
Gentianella amarella
G. campestris
†† *Hieracium pellucidum*
†† *H. vulgatum*
Hypericum hirsutum
H. maculatum
†† *Juncus squarrosus*
Limosella aquatica
Littorella uniflora
Lychnis viscaria
Menyanthes trifoliata
Parnassia palustris
†† *Pedicularis palustris*
Pinguicula vulgaris
†† *Poa palustris*
†† *P. subcaerulea*
Potamogeton compressus
P. obtusifolius
P. praelongus
Potentilla palustris
†† *Prunus padus*
Pyrola media (extinct)
†† *Rhynchospora alba*
†† *Rosa caesia*
Sagina nodosa
Salix aurita
S. pentandra
Scheuchzeria palustris (extinct)
†† *Sparganium minimum*
Stellaria palustris
Trichophorum cespitosum
Utricularia minor
Vaccinium oxycoccos
†† *V. vitis-idaea*
Vicia sylvatica
Viola palustris

Northern-Montane Element (0.7%)

†† *Isoetes lacustris* (extinct)
Listera cordata (extinct)
Nuphar pumila
Pseudorchis albida (extinct)
Rubus saxatilis (extinct)
Trollius europaeus

Oceanic Northern Element (0.7%)

†† *Epipactis phyllanthes*
†† *Euphrasia confusa*
†† *Hieracium anglicum*
Lobelia dortmanna (extinct)
Myrica gale
Narthecium ossifragum
†† *Sorbus rupicola*

North American Element (0%)

Arctic-Subarctic Element (0%)

Arctic-Alpine Element (0.1%)

Potentilla crantzii (extinct)

Alpine Element (0%)

Endemic Element (0.5%)

†† *Euphrasia anglica*
†† *Fumaria purpurea*
†† *Hieracium carneddorum*
†† *H. cinderella*
†† *H. eboracense*
†† *H. saxorum*
†† *Senecio cambrensis*
†† *Sorbus anglica*

PART TWO
Habitats and Plant Communities

How sweet I roam'd from field to field
And tasted all the summer's pride.

Poetical Sketches
William Blake, 1783

Introduction

Shropshire is a large land-locked county which exhibits major regional variations in geology, topography, climate and land use. Its vegetation is correspondingly varied, forming an indescribably complex continuum whose pattern changes with the seasons and over the centuries. A comprehensive description, however, is unnecessary as well as unattainable. Within the environmental continuum a combination of similar habitat factors and site histories at widely separated localities can result in the disjunct occurrence of the same species, or of similar groupings or associations of species. Amongst the many repetitions in the pattern are the mossy flushes on the Stiperstones and Catherton Common, the sessile oakwoods on the Ercall and near Clun, and the calcicole communities of the limestone quarries in the Oswestry uplands and on Wenlock Edge.

This linked repetitiveness of habitat and vegetation provides the basis for the five chapters in Part Two. Chapter 9 discusses ecological change, its detection in the recent past, and its implications for the future. With some inevitable overlap, each of Chapters 5 to 8 takes a major class of habitat types and structurally related communities (5: Open water and wetland; 6: Rock, heath and grassland; 7: Woodland, hedge and scrub; 8: Disturbed and ruderal habitats) and describes a number of contemporary examples in two very different ways: one based on the classic British tradition of Tansley (1939) and of Ratcliffe (1977), the other using computer analyses of a selected sample of recorded stands. Stand records, which provide precise descriptions of particular areas of vegetation, form a potentially very satisfactory means of illustrating variation within wetlands, grasslands, woodlands or disturbed habitats, though much depends on the choice of samples. Such records, however, need to be ordered in some way if the information they contain is to be properly assimilated and used by the reader. The primary function of the computer analysis employed in the present work is to do just this: sorting the stand records into groups about which generalisations can be made. The remainder of the introduction gives details of how the vegetational data was collected and subjected to computer analysis.

We hope, then, that the thickets of Latin names and the barbed wire of binary numbers will not wholly obscure the beauty and diversity of the region and its vegetation, and that our survey will make some contribution to the reader's understanding of the interactions between plants and their environment.

Materials and methods

For each of the four main types of community, general considerations, and those peculiar to the region, are dealt with first. Because we believe that discussion of the vegetation should be based on specific observations, there then follows a table showing a limited number of *stand* records of the type of vegetation concerned. A stand is a sample of vegetation enclosed within a quadrat of an area thought to be appropriate for the community concerned ($1m^2$ for grasslands and heaths, $4m^2$ for wetlands and for disturbed and waste places, $25m^2$ for woodlands). All species of herbs and dwarf shrubs, and often bryophytes and lichens, were assessed on the Domin scale (see table below):

	Cover	
Class 10	91–100%	
Class 9	76– 90%	
Class 8	51– 75%	
Class 7	34– 50%	
Class 6	26– 33%	
Class 5	11– 25%	
Class 4	4– 10%	
Class 3	> 4%	frequent
Class 2		sparse
Class 1		rare

Domin cover-abundance scale (as used by us following the National Vegetation Classification).

The purpose of the stand tables is to illustrate the variation within particular vegetation types in the Shropshire Region. There has been no attempt to sample the county systematically. Most of the samples were obtained from key localities, and at each site one or a very small number of stand sites were chosen subjectively to demonstrate typical or interesting situations. As the sampling method used was not considered suitable for truly aquatic vegetation, for example, the stand tables should not be taken as a complete summary of Shropshire vegetation types.

The records for these stands were analysed by computer and an indicator species classification is given for all four main types of vegetation. This vegetation classification is based on an ordination technique called reciprocal averaging, examples of which are given in 5.2. We appreciate that many readers will not previously have encountered these techniques, but they are very helpful in attempts to understand relationships between different species or between different stands of vegetation. Despite the subjective choice of the samples, it will rapidly become apparent to the reader that the analysis frequently succeeds in extracting useful and valid generalisations about the floristic diversity of the vegetation. There is little difficulty in establishing the relationships between the 'classical' and 'computer-based' approaches adopted in Chapter 5–8 and both gain from the comparison. Indeed, one of the objects of the indicator species analysis employed (Hill, Bunce and Shaw 1975) is that the resulting groups should have a straightforward ecological interpretation. The next few paragraphs give an elementary explanation of how these computer methods have been used.

ANALYSIS OF THE VEGETATION RECORDS

The vegetation records were analysed by computer using two methods—the reciprocal averaging ordination programme developed by Hill (1973) and indicator species analysis (Hill, Bunce and Shaw 1975). The assumption underlying both techniques is that the distribution of plant species is not random, but that their presence or absence yields information about the environmental conditions within, and sometimes the past history of, the stands of vegetation which have been recorded.

The information employed as the basis of the analysis is a stand/species matrix, which is in effect a series of species lists, one for every quadrat used. The first part of the analysis is ordination—literally 'arranging things in order'. In a stand ordination the stands are placed in order according to the species they contain. Reciprocal averaging is a method of ordination which has the advantage of providing both a stand ordination and a species ordination at the same time, the species (in the species ordination) being placed in order according to the stands in which they occur.

The basis of the 'arranging in order' is correlation. For example, two calcicole species are likely to occur together in the same quadrats more often than would result from chance; the pattern of their absences is also likely to show a similarity and the two species are said to be positively correlated. The computer programme also uses negative correlations between species whose joint occurrences are less than those predicted on the basis of chance. Often, of course, a factor such as high base status will affect the distributions of many of the species concerned, some preferentially and others adversely.

In a species ordination which is a reflection of the differing abundance of soil bases in the various quadrats one can expect to find calcifuges at one end, calcicoles at the other, and species whose distribution is more strongly determined by factors other than soil bases in the centre. The computer programme will have delimited an 'axis of variation' and distributed the species along it. It should be noted that the computer will have extracted this axis mathematically from the data concerning the species in each of the various stands: it is the task of the experimenter to try to define the vegetational or environmental gradients which such an axis represents. An axis may represent an ecological gradient which is simple and easily identified, or one which is more complex or even obscure.

Ordination is not completed with the isolation of a single axis of variation. Indeed, one would not expect it to be, since plant distribution is influenced by many partially independent factors including, for example, the degree of shading and the rapidity of soil drainage, rather than by a single environmental gradient. It is also clear that the influence on the distribution of plant species of a factor such as shading is likely to be quite different from that of the base status of the soils in the various quadrats. In creating an ordination, therefore, the computer programme first delimits the axis corresponding to the factor (or complex of related factors) which has the greatest effect on plant distribution, i.e. the one which in mathematical terms accounts for more of the original variance in the data than any other axis. It then repeats the analysis for successively less influential axes of variation which theoretically correspond to environmental gradients of lower importance than the first. It is conventional to illustrate the results obtained by ordination using two-dimensional graphs such as those shown in section 6.2 where the species (Fig. 6.4a) and the stands (Fig. 6.4b) are plotted in relation to axes 1 and 2.

Ordination is also the basis of indicator species analysis which starts with a stand ordination, using only the axis which corresponds to the most important gradient. The point along this axis which represents the mean of the ordination scores for all the stands present is known as the 'centre of gravity'. It is this point which is used to delimit group 0, which lies on the left, from group 1 which lies to the right. This is the basis of the whole procedure; its finer points are discussed by Hill, Bunce and Shaw (1975). The process is repeated to give a series of divisions of the stands into smaller and smaller groups. Group 0 is divided into groups 00 and 01, group 1 into groups 10 and 11, and so on. In Fig. 6.4b the margins between the major indicator species groups have been superimposed on the ordination.

Indicator species analysis also selects indicator species which can subsequently be used to 'key out' the groups to which stands belong without further recourse to a computer. A perfect indicator occurs in all of the stands on one side of a division and in none of the stands on the other side. The computer programme nevertheless employs as indicators species which are merely more frequently encountered in stands of one group than of the other. The indicator value (Ij) of any species (j) is defined mathematically:

$$Ij = \frac{m_1}{M_1} - \frac{m_2}{M_2}$$

where m_1 is the number of occurrences of species j in group 0 which contains M_1 stands, and m_2 is the number of occurrences in the other group (1) which consists of M_2 stands.

The fact that the method can use plants that are not perfect indicators sometimes causes the same species to be used as an indicator more than once in the same analysis, a point which is well illustrated in the explanation of the indicator species analysis of the woodland field layer (see section 7.7).

5 Open water and wetland

Cole Mere in winter, fringed by dead reeds

5.1 Wetland diversity

SPRINGS and seepages high in the Border hills lace the dark moorland with threads and beads of green, forming the headwaters of several rivers. The Boiling Well on the Long Mynd is typical; the constant flow of cool, clear water maintains a moderate supply of mineral nutrients though lime and other dissolved bases are not present in excess. Around such springs and runnels the fertility of the soil is enhanced by the droppings of the sheep who gather there to graze, keeping the sward closely cropped and rich in species. Base-enrichment also occurs locally farther down the valleys where water flushes a footslope or seeps from exposed rocks; these are notable bryophyte habitats. The stony hill streams often scour their beds in spate; aquatic vegetation is limited to a few specialised macrophytes and rock-clinging mosses, algae and lichens (Arnold and Macan 1969).

True blanket bog, such as that which covers the wetter Berwyn Mountains with deep layers of peat, is absent from our region today; there is some archaeological and floristic evidence that it may have occurred formerly (see chapter 9). Comparable wet heath and valley-mire vegetation can, however, be found on the waterlogged, oxygen-deficient and acid soils of Catherton Common. There and elsewhere in the hills of the south and west lateral water movement through peaty soils bordering slow upland runnels favours a more diverse valley-mire flora with several species of sedge.

Lime-rich waters from calcareous strata are scarce in Shropshire but of great botanical interest. The cascades in Great Hudwick Dingle are furnished with petrified screens of tufa deposited on living mosses. The spring-fens and calcareous mires of the Oswestry Hills carry a distinctive and beautiful flora whose richness may be partly explained by the low availability of phosphate in lime-saturated soils. There are interesting similarities to the grazed fen-pastures bordering certain meres. Typical spring-fen species were recorded by Leighton from sites at the foot of Wenlock Edge, but modern farming has destroyed this habitat (see chapter 9).

Springs in lowland woods and dingles are often marked by extensive patches of golden saxifrage, while shady seepages on wet clay may carry great horsetail or pendulous sedge. The stench of ramsons on the banks of fern-fringed woodland streams can be an appetizer for more exciting finds: yellow star-of-Bethlehem, green figwort, touch-me-not balsam. The streams themselves, with their winter load of rotting leaves, generally have a poor aquatic flora apart from algae and bryophytes. Watercress is a plant of sunny springs and clean but base-rich water. The stony, open reaches of the lesser rivers of the Shropshire Plain, such as the Perry, Rea, Roden and Tern, support a variety of flood-resistant plants.

TYPICAL SPECIES

1 **Upland springs:** *Ranunculus hederaceus, Sagina procumbens, Montia fontana, Myosotis secunda, Eleocharis quinqueflora, Carex panicea, Philonotis fontana, Bryum pseudotriquetrum, B. weigelii, Marchantia polymorpha.* **Seepages and flushes:** *Hypericum elodes, Anagallis tenella, Pinguicula vulgaris, Amphidium mougeotii, Fissidens adianthoides, Ctenidium molluscum, Leiocolea bantriensis, Trichocolea tomentella, Scapania undulata.* **Stony hill-steams:** *Apium nodiflorum, Mimulus guttatus, Rhacomitrium aciculare, Brachythecium rivulare, Eurhynchium riparioides, Hygroamblystegium fluviatile, Lemanea mammillosa, Verrucaria aethiobola, Staurothele fissa.*

2 **Wet heaths and valley mires:** *Viola palustris, Drosera rotundifolia, Erica tetralix, Gentiana pneumonanthe, Scutellaria minor, Wahlenbergia hederacea, Potamogeton polygonifolius, Narthecium ossifragum, Juncus bulbosus, Dactylorhiza ericetorum, Trichophorum cespitosum, Carex hostiana, C. nigra, C. curta, C. echinata, C. pulicaris, C. dioica, Aulacomnium palustre, Sphagnum compactum, S. plumulosum, S. recurvum, S. subsecundum, S. tenellum.*

3 **Tufa screens and cascades:** *Eucladium verticillatum, Barbula tophacea, Cratoneuron commutatum.* **Calcareous mires and spring-fens:** *Trollius europaeus, Sagina nodosa, Parnassia palustris, Samolus valerandi, Galium uliginosum, Valeriana dioica, Crepis paludosa, Triglochin palustris, Juncus subnodulosus, Epipactis palustris, Eriophorum latifolium, Carex lepidocarpa, Mnium seligeri, Climacium dendroides, Acrocladium cuspidatum, Campylium stellatum.*

The Severn is a major river whose middle reaches traverse the region from west to south-east, importing not only Welsh water but also Welsh topsoil at times of spate. Unlike its local tributaries the waters of the Severn are seldom really clear, but in spite of a heavy and increasing load of nutrients from agricultural and domestic sources it is not yet severely polluted. Where it crosses the plain, the Severn occupies a channel whose cross-section is unusually narrow and deep for a lowland river; this gives it an exceptional amplitude or vertical range (4.5–6.0m) between low-water and bank-full stages. At summer low-water a regular sequence of shallow, stony riffles may be seen: they are especially striking viewed from the air, when they are picked out by flowering patches of river crowfoot separated by long, deep pools.

Apart from water-milfoil, perfoliate pondweed and a rare moss on boulders and bridge-footings, the associated aquatic flora is very restricted by the combination of unfavourable conditions. The Severn in flood lays down a thick layer of silt which not only acts as a fertilizer to encourage the growth of nettles, docks and other tall herbs but also blankets and suppresses smaller plants. The distinctive flood-zone vegetation is much modified by grazing and the activities of anglers, and is therefore best seen on the little-visited eyots which occur at intervals along the course of the river. Riverside plants spread downstream with relative ease by seeds and other means; it is interesting to note, however, at least one example of successful recent invasion in the reverse direction: the Indian or Himalayan balsam. The course of the River Severn has been changed by artificial and natural causes, leaving cut-off meanders, of which the most notable is the Old River Bed north of Shrewsbury.

Stagnant, nutrient-rich waters (especially phosphate and nitrate-enriched) occur in innumerable ditches and field ponds, usually on clay; many of the latter were probably dug as marl pits. Small clay-lined ponds have also been created for specialised purposes, as balancing reservoirs for drainage systems, for mines, ironworks and other industrial uses, besides the larger basins in abandoned brick, sand and gravel pits.

An important characteristic of these isolated pools is the chance element in their flora. Variations in species present from pond to pond may be more a matter of first arrivals than of environmental differences. Another common feature of these small water-bodies is a strong seasonal variation in the water-table, often resulting in extensive areas of bare mud in summer, colonised by annuals such as celery-leaved buttercup and bur marigolds. Meadowsweet indicates a fluctuating water-level below the ground surface; greater reedmace and great (hairy) willowherb are particularly tolerant of pollution.

Canals which are still navigated by pleasure craft are so thoroughly maintained, and their waters so constantly turbid from the passage of boats, that their botanical interest is small; this was not so in the recent past: before 1960 submerged aquatics including seven pondweed species could be found in the Ellesmere Canal. Once abandoned by traffic, however, a canal can rapidly become one of the richest of all man-made and man-managed habitats (Twigg 1959). The water often retains a small but measurable flow and a constant level at all seasons. It is well supplied with lime and other nutrients, but none to excess. There is a gentle depth gradient from each margin to the central channel which is about 1.2m deep, giving a clear zonation of plant communities. Until very recently even the disused lengths were maintained by occasional cutting which held back the succession and so prevented the shading out of the rich aquatic flora by the tall emergent reedswamp, and by alders on the banks.

Some of the old canals have declined in interest because of heavy grazing, pollution or lowering of the water-level. The most interesting surviving reaches include several lengths of the Montgomery Canal and (until the early 1970s) the Prees Arm. These reaches are characterised by a good submerged aquatic flora (including several pondweed species and hornwort, floating-leaved aquatics such as frogbit and floating water-plantain and, at Edgmond, the fringed water-lily). Towards the margins the emergent vegetation is typically dominated by reed sweetgrass, with flowering-rush as an attractive associate. The marsh zone between the reeds and the tow-path is very luxuriant and rich in species, and bare patches of mud are rare.

4 **Woodland springs and stream-sides:** *Equisetum telmateia, Athyrium filix-femina, Aconitum napellus, Thalictrum flavum, Cardamine amara, Impatiens noli-tangere, Chrysoplenium alternifolium, C. oppositifolium, Circaea × intermedia, Scrophularia umbrosa, Gagea lutea, Allium ursinum, Carex laevigata, C. pendula, C. remota, Pellia epiphylla, Conocephalum conicum.* **Sunny springs and small lowland rivers:** *Nasturtium officinale, Myriophyllum spicatum, Callitriche platycarpa, Veronica beccabunga, Elodea canadensis, Potamogeton crispus, Sparganium emersum, Catabrosa aquatica, Fontinalis antipyretica.*

5 **River Severn:** *Ranunculus fluitans, Myriophyllum spicatum, Potamogeton perfoliatus, P. pectinatus, Octodiceras fontanum.* **Banks and eyots:** *Myosoton aquaticum, Brassica nigra, Impatiens glandulifera, Limosella aquatica, Salix triandra, S. viminalis, Tanacetum vulgare, Carex acuta, Phalaris arundinacea, Tortula latifolia, Leskea polycarpa.*

6 **Ditches, farm ponds and clay pits:** *Ranunculus sceleratus, Stellaria palustris, Filipendula ulmaria, Lythrum salicaria, L. portula, Epilobium hirsutum, Rumex maritimus, Hottonia palustris, Myosotis scorpioides, Solanum dulcamara, Lycopus europaeus, Scutellaria galericulata, Bidens cernua, B. tripartita, Alisma plantago-aquatica, Iris pseudacorus, Sparganium erectum, Typha latifolia, Carex acutiformis, C. riparia, C. pseudocyperus, C. disticha, Glyceria plicata, Poa palustris, Agrostis stolonifera, Physcomitrium pyriforme, Leptodictyum riparium.*

7 **Disused canals:** *Ceratophyllum demersum, Berula erecta, Rumex hydrolapathum, Nymphoides peltata, Luronium natans, Butomus umbellatus, Hydrocharis morsus-ranae, Potamogeton alpinus, P. praelongus, P. friesii, P. obtusifolius, Lemna polyrhiza, Carex otrubae, Glyceria maxima.*

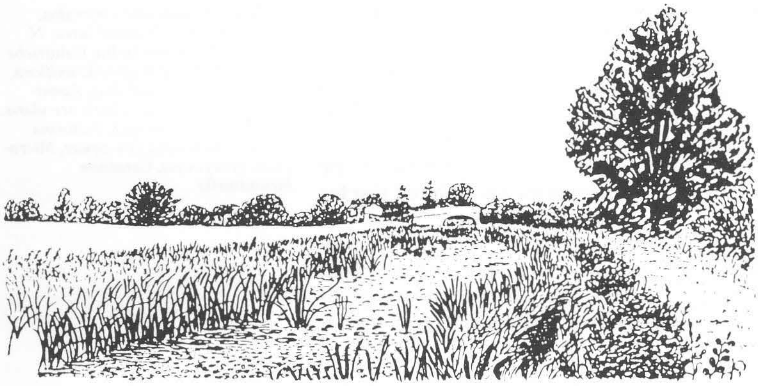


Figure 5.1 *View of canal near Redwith, SJ 304245, in summer 1958, after 20 years' disuse and c30cm drop in water level; towpath is on right. (From Twigg 1959).*

Upland reservoirs for water supply are few and small in Shropshire and none is noteworthy botanically. Wildmoor Pool on the Long Mynd and Llyn Rhuddwyn in the Oswestry Hills are somewhat different examples of the oligotrophic soft-water upland pools. The water of Wildmoor Pool is shallow, clear but rather peaty and acid. Bottle sedge, water horsetail and floating pondweed are the dominant plants; Shelve Pool and the Long Pool at the Bog are similar. Llyn Rhuddwyn has shallow open water, and extensive mud with shoreweed, but is being rapidly invaded by soft rush, marsh cinquefoil and sallows.

8 **Oligotrophic pools:** *Equisetum fluviatile, Pilularia globulifera, Ranunculus aquatilis, Potentilla palustris, Apium inundatum, Oenanthe aquatica, O. fistulosa, Menyanthes trifoliata, Littorella uniflora, Baldellia ranunculoides, Potemogeton natans, Juncus effusus, Sparganium minimum, Eleocharis palustris, Eleogiton fluitans, Carex rostrata, C. vesicaria, Alopecurus aequalis, Riccia fluitans.*

The most varied group of pools in the region are those at Brown Moss, which probably originated after the almost total removal of peat from a former bog. About eight pools of varying sizes lie in hollows in an undulating sand and gravel basin. Their water levels (and therefore their other dimensions) vary dramatically from season to season: during dry periods surface water disappears entirely from several of them, exposing concentric species-rich zones whose plants are differentially tolerant of flooding or exposure. The water is generally poor in nutrients and lime, but its base-status varies from pool to pool. Among the most noteworthy features are large floating rafts of bogbean, the local abundance of lesser marshwort, floating club-rush and orange foxtail, and the rare occurrence in this region of lesser water-plantain, least bur-reed and (until recently) pillwort.

There are a number of ornamental lakes (mostly of artificial origin) in various parts of the county, but these are generally of more ornithological than botanical interest.

The meres are perhaps the most celebrated natural features in Shropshire, occurring also in Cheshire and Staffordshire (Sinker 1962; Reynolds 1979 etc). There are over thirty meres in the region, ranging downwards in size from Aqualate Mere (72.5ha) and The Mere at Ellesmere (46ha). The lower size limit is more difficult to specify: pools such as Oxon and Cottage Pond (less than a hectare) have certain mere features. A typical mere does not have surface streams feeding or draining it, but is maintained by the percolation of mineral-rich water from the permeable glacial drift in which it lies; some have ditches associated with them, but these are mostly of recent construction, serving to lower the water table in the adjacent peatlands. The water level of most meres varies very little seasonally.

In view of their rich nutrient supply, the macrophyte flora of the meres is surprisingly poor. High nutrient levels are an important factor in the production of large populations of floating algae (phytoplankton): spectacular concentrations in the population of blue-green algae near the surface cause the famous 'blooms' in still weather in summer and autumn, a phenomenon known locally as the 'breaking of the meres' (Reynolds 1978). It may be the shading effect of the dense surface blooms which keeps down the variety of macrophytes.

The least eutrophic meres, such as Newton Mere and Bomere, still have a shoreweed-waterwort bottom sward; this may be a relic of more oligotrophic conditions in the past, when water lobelia was recorded from at least four meres. Colemere, typical of the moderately eutrophic group, has a submerged macrophyte flora which includes autumnal water starwort and pondweeds. Crosemere and other highly eutrophic meres have horned pondweed only or lack submerged macrophytes altogether. Water-lilies, too, appear to be declining in abundance: the least water-lily, emblem of the Shropshire Trust for Nature Conservation (STNC), is now known from only one site.

9 **Meres:** *Ranunculus circinatus, Nymphaea alba, Nuphar lutea, N. pumila, Elatine hexandra, Callitriche hermaphroditica, Littorella uniflora, Potamogeton obtusifolius, Zannichellia palustris, Eleocharis acicularis, Stephanodiscus astraea, Eudorina elegans, Anabaena flos-aquae, Microcystis aeruginosa, Ceratium hirundinella.*

The meres are difficult to classify and their differences little understood. Depth and other dimensions, together with exposure, are no doubt important, but perhaps the most significant factors are the past and present nature of adjacent land-use and the degree of development of fringing emergent vegetation.

Where they are not too exposed to wave action, not heavily grazed and not overhung by trees, the shallow margins of the meres are invaded by reedswamp. This consists of more or less extensive beds of common reed and lesser reedmace, normally rooted on the bottom to a depth of up to 1.2m. Their dead remains accumulate in winter and so reduce the water depth. In rare instances, such as the very sheltered Sweatmere basin, the reedmace may spread over the water by means of a floating rhizome raft.

The result of either process is a nutrient-rich peat surface close to water level in which a variety of fen plants, notably greater tussock-sedge and other tall sedges, become established; this tall-sedge fen differs from most upland fens in being well-supplied with available phosphate and nitrogen. On the north shore of Crosemere and at certain other sites, heavy cattle grazing has deflected the succession at this stage to a rich fen-pasture, similar floristically to the spring-fens described above. The normal succession proceeds otherwise: seedlings of sallow and alder become established among the sedges, eventually growing up to form a dense fen-woodland or carr, whose ground flora includes some very rare species as well as the remnants of the earlier successional stages. The relatively dry crowns of the old sedge tussocks, often more than a metre tall, carry a distinctive woodland flora of their own. Sweatmere is the classic site for this succession (Tansley 1939), and similar communities can be seen at certain other mere-fens such as Hencott 'Pool' where no pool now exists. Fens not associated with meres are now very rare and may be of secondary origin (e.g. Berrington Moss and The Yesters).

10 **Reedswamp:** *Typha angustifolia, Schoenoplectus lacustris, Cladium mariscus, Phragmites australis.* **Fen and carr:** *Thelypteris thelypteroides, Ranunculus lingua, Cicuta virosa, Alnus glutinosa, Salix cinerea, Lysimachia vulgaris, Carex elata, C. elongata, C. paniculata, Calamagrostis canescens,* (**on tussocks**) *Geranium robertianum, Oxalis acetosella, Valeriana officialis,* (**Wet peat**) *Acrocladium cordifolium.*

Whether the fen succession has built up from the bed of a mere or by means of a floating raft, there comes a stage when the peat surface is no longer accessible to nutrient-rich water and is kept wet mainly by rain. Atmospheric water lacks bases to neutralize the organic acids in peat, and the pH of the surface falls to 4 or less with dramatic changes in the vegetation. Sites which have reached this

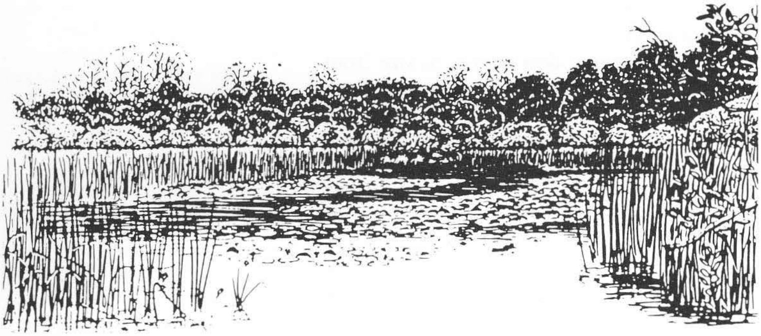


Figure 5.2 *View of Sweat Mere, SJ 437305, in summer 1958, looking NW: Central pool with lily-pads of* Nuphar lutea; *broad surrounding raft of* Typha angustifolia: *bushes of* Salix cinerea, *and* Alnus glutinosa *carr (wet alder-wood) in the background. (From Sinker 1962).*

stage are called peat-bogs, or 'mosses'. The new communities, in which *Sphagnum* species play an important part, are restricted to plants whose mineral nutrient requirements are low: cotton-grasses, sundews and various members of the heather family, for example. *Sphagnum* absorbs moisture and maintains the upward growth of accumulating peat. In a raised bog the accumulation is greatest in the central area and the surface therefore becomes slightly convex; in a basin mire a peripheral zone of bog normally surrounds a central pool. Basin mires, very rare in Britain generally, are well-represented in our region but difficult and dangerous of access.

None of our lowland bogs remains intact. The largest, the Whixall Moss–Fenn's Moss complex on the Shropshire–Clwyd border, has been much affected by peat-cutting, drainage and fire. Old peat cuttings with their surface close to the water table may re-create conditions suitable for a varied selection of *Sphagnum* species and liverworts, and rare or local flowering plants such as lesser bladderwort, bog asphodel, white beak-sedge and cranberry. Occasional fires appear to favour bog rosemary and hare's-tail cottongrass. Parts of Bettisfield Moss and Clarepool Moss have become wooded by natural regeneration of Scots pine and downy birch. Conifer plantations have spoiled once interesting sites such as Smithy Moor and Whattall Moss. Reclamation for agriculture, some of it dating back to the early seventeenth century (Plymley 1803), has altered hundreds of hectares of former peatland: even ditches are of little botanical interest today.

11 **Peat bogs:** *Osmunda regalis, Dryopteris carthusiana, Pinus sylvestris, Drosera anglica, D. intermedia, Myrica gale, Betula pubescens, Erica tetralix, Andromeda polifolia, Vaccinium oxycoccos, Utricularia minor, Narthecium ossifragum, Eriophorum angustifolium, E. vaginatum, Eleocharis multicaulis, Rhynchospora alba, Carex limosa, Sphagnum magellanicum, S. papillosum, S. pulchrum, S. cuspidatum, S. rubellum, Polytrichum alpestre, Gymnocolea inflata, Mylia anomala, Odontoschisma sphagni, Cladonia floerkeana, C. impexa.*

5.2 Computer analysis of the quadrat data

The primary division of the data (Fig. 5.3) has segregated the small number of the most acid (oligotrophic) peatland stands forming Group 1 from the much more variable but predominantly more base rich (meso- and eutrophic) stands of Group 0. This can be checked by consulting Table 5.1, a stand-species matrix for 42 of the 60 plots analysed, and Fig. 5.4, which gives pH values and numbers of species present in the six groups adopted. Stand 42, with 23 species and a pH of 5.8, was classified as a "borderline" member of Group 1 by the computer programme and has strong affinities with Group 001.

Group 0 is divided fairly evenly into Group 00, whose indicator species are essentially terrestrial, and the much wetter stands of Group 01. Whereas Group 01 appears again to have a more (Group 011) and less (Group 010) aquatic component, the division of Group 00 is less clearly associated with the degree of dampness; indeed base status (see Table 5.1 and Fig. 5.4) appears to be the

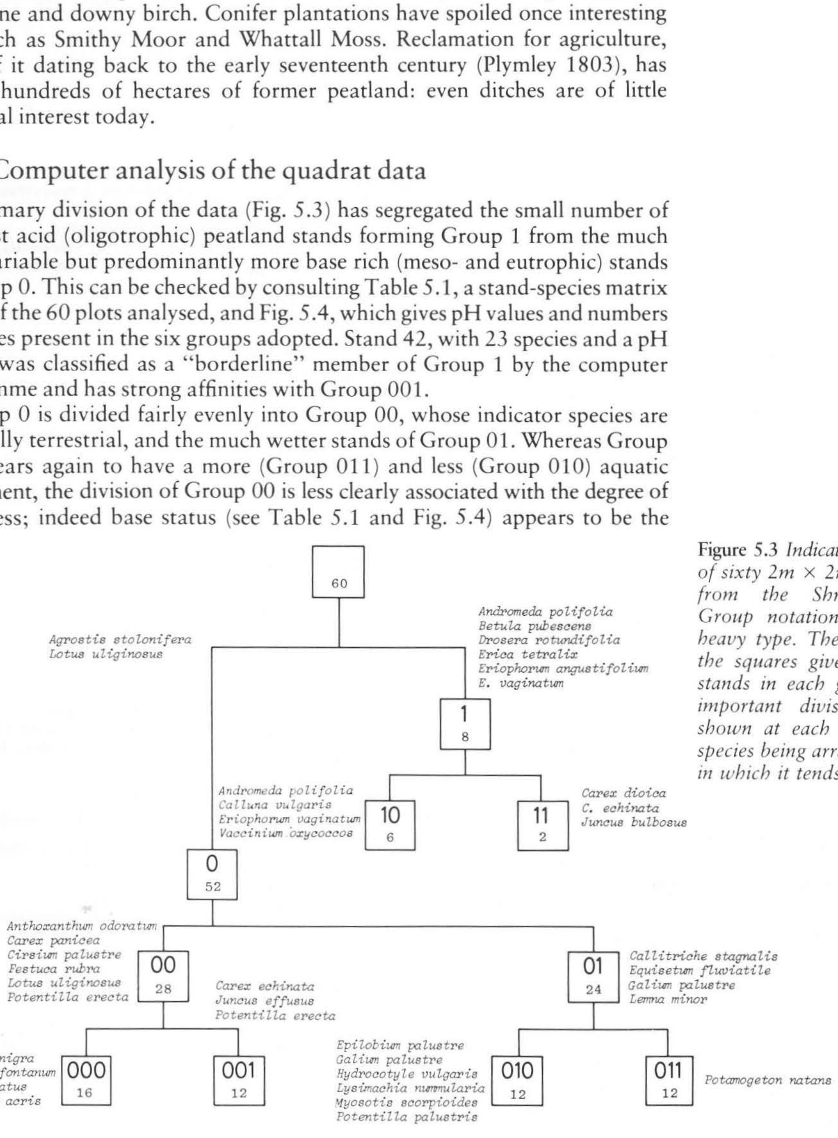


Figure 5.3 *Indicator species analysis of sixty 2m × 2m wetland stands from the Shropshire region. Group notations are shown in heavy type. The other figures in the squares give the number of stands in each group. The most important division species are shown at each separation, each species being arranged on the side in which it tends to be present.*

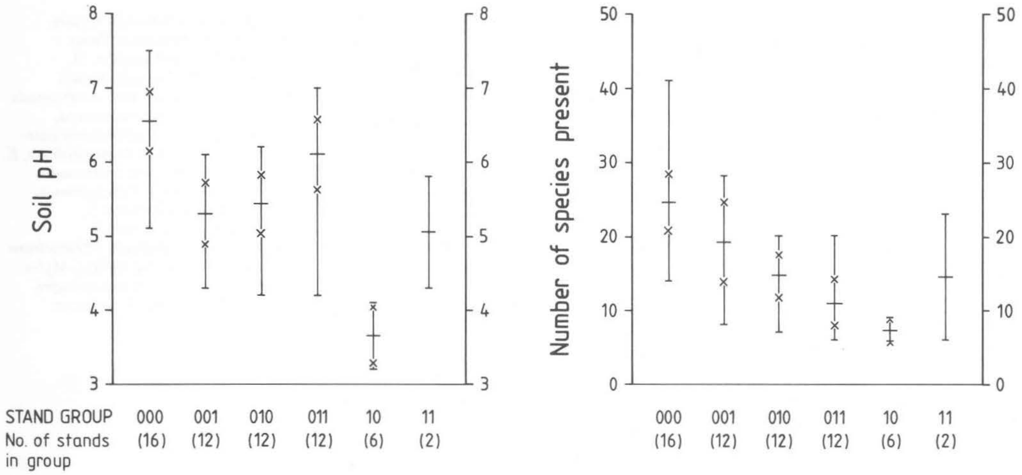


Figure 5.4 *Soil pH and species density (per 4m²) for the major polythetic divisive groups in sixty wetland stands from the Shropshire region. Each vertical bar shows the mean and individual maximum and minimum values found within each group. 95% confidence are shown by the crosses. Soil pH was determined from samples taken at 0–5 cm depth.*

primary influence in dividing Group 000 from the more acidic Group 001. Star sedge, soft rush and tormentil are all characteristic of poor, generally acid soils (Ellenberg 1979) whilst common knapweed, creeping buttercup, Yorkshire fog, and common mouse-ear are much less commonly associated with such conditions. Group 001 is in fact transitional to the more definitely base-deficient Group 1, whose eight stands provide a rather inadequate sample of heathy wetlands.

Group 001 indicators
Carex echinata, *Juncus effusus*, *Potentilla erecta*
Group 000 indicators
Centaurea nigra, *Ranunculus repens*, *Holcus lanatus*, *Cerastium fontanum*

Daniels (1978), in an indicator species analysis of 56 wetland sites throughout Britain, found the same primary division into oligotrophic and mainly meso- and eutrophic sites. He further considered that most of the divisions within his classification could best be interpreted in terms of variation in degree of eutrophy and in the relative wetness of the different sites. Although Daniels included bryophytes in the data, his analysis clearly involved the same major factors as those identified in the present study.

Returning to the computer analysis, Group 000 was further divided into two groups. Group 0000 (including stands 1–6) forms a fairly diverse assemblage corresponding to some extent with Type 6 described in section 5.1 as "small bodies of stagnant, nutrient-rich water – ditches, farm ponds, flooded hollows in wet meadows". Other stands which would also fit this definition have been placed by the computer analysis in Group 01, having been separated from Group 0000 on account of their more aquatic nature.

Within Group 0000 stand 1 is a drainage ditch in a fairly unimproved wet meadow, and stand 3 is a rather shallow ditch in a particularly species-rich wet meadow which probably developed after clearance of fen carr. Stand 2 is a small, silted-up farm pond in fairly improved pasture with grassland species such as meadow fescue, species of nutrient-rich farm ponds such as floating and small sweet-grass, and mesotrophic marsh plants such as common marsh-bedstraw and ragged-robin. Stand 4 is from a roadside verge on clay which probably receives much of its groundwater from adjacent deciduous woodland. Its flora includes woodland elements such as creeping soft-grass and wild angelica and several mesotrophic marsh species.

Group 0000 indicators
Anthoxanthum odoratum, *Holcus lanatus*, *Agrostis capillaris*, *Galium palustre*

Festuca pratensis

Glyceria fluitans, *Glyceria declinata*

Galium palustre, *Lychnis flos-cuculi*

Holcus mollis, *Angelica sylvestris*

Stands 5 and 6 were identified by the computer as borderline between groups 0000 and 0001. Stand 5 is from a flushed area in unimproved neutral pasture, and stand 6 is from the band of markedly species-rich vegetation grading into hedgerow which surrounds the rich calcareous fen of which stand 9 is a sample.

Group 0001 represents a much more lime-rich facies than Group 0000, and brings together stands exemplifying the spring fens and rich fen pastures described as types 3 and 10 in Section 5.1, with such characteristic species as globeflower, grass-of-Parnassus, blunt-flowered rush, marsh helleborine, broad-leaved cottongrass, and long-stalked yellow-sedge. Stand 8, a small isolated flush in the edge of ancient woodland near Much Wenlock, demonstrates that this type of vegetation can develop here on the Silurian limestone as well as on the Carboniferous limestone of the Oswestry area. Similar flushes also occur on Dowles Brook in the Wyre forest.

Trollius europaeus, Parnassia palustris Juncus subnodulosus, Epipactis palustris, Eriophorum latifolium, Carex lepidocarpa

Grazed examples (stands 7–9) of this group of stands have a very large number of vascular plant species with intermediate Domin values and a high percentage cover of bryophytes. Ungrazed examples (stands 10 and 11) tend to have tall **forbs** (herbs other than ferns and graminoids) such as hemp-agrimony and meadowsweet as dominants; experience at Sweeney Fen (stand 10) suggests that such growth forms rise to dominance when grazing animals are fenced out.

Eupatorium cannabinum, Filipendula ulmaria

Wheeler (1980) recognises three main community types of English and Welsh calcareous mire. Most of the communities represented by the stands of Group 0001 would conform to his "Schoeno-Juncetum subnodulosi" in which black bog-rush or blunt-flowered rush are often dominant. Wheeler suggests that this community is a southern lowland type in Britain.

Schoenus nigricans, Juncus subnodulosus

The mire of which stand 8 is an example approaches a second of his three community types, one characterised by dioecious sedge, few-flowered spike-rush and common butterwort. Wheeler found this community largely in limestone areas of northern England. He would probably classify the fen represented by stand 10 as rich-fen meadow, which characteristically develops as "small stands within agricultural landscapes, associated with springs and seepage areas or in ill-drained bottoms of small valleys". Sedges and rushes of medium height are usually dominant, e.g. lesser pond-sedge, jointed rush, sharp-flowered rush, and blunt-flowered rush.

Carex dioica, Eleocharis quinqueflora, Pinguicula vulgaris

Carex acutiformis, Juncus articulatus, Juncus acutiflorus, Juncus subnodulosus

Stand 12 introduces Group 001, which represents a wide range of less base-rich situations at higher altitude than those described in Group 000. When this group is subdivided the single indicator for Group 0010 is mat-grass, suggesting sites with highly leached, skeletal soils. Indicators for Group 0011 include marsh bird's-foot-trefoil, cuckooflower, and purple moor-grass, suggestive of soils with more lateral movement of water and bases.

Group 0010 indicator
Nardus stricta

Group 0011 indicators
Lotus uliginosus, Ranunculus repens, Cardamine pratensis, Potamogeton polygonifolius, Carex hostiana, Molinia caerulea

Within Group 0010 (including stands 12–16) stands 13, 14, and 16 conform to the above analysis, being examples of acid upland flushes and valley bogs on hard siliceous rock in different parts of the region and intermediate with the stands which form Group 1. Further similar Group 0010 quadrats from Titterstone Clee and the Stiperstones ridge have been omitted from Table 5.1. The group approaches Type 2 described in Section 5.1 but includes some stands intermediate with wet upland acid grassland. Also within Group 0010, stand 12 is from the margin of an artificial reservoir on Brown Clee. Stand 15 is from a large, lightly grazed, flushed area at the base of Paulith Bank, Wescott, and is transitional with Group 0011 as is stand 16, a somewhat flushed area in a small valley bog in the siliceous uplands to the west of Oswestry.

Group 0011 constitutes a somewhat more species-rich group of upland sheep-grazed springs corresponding to Type 1. Stand 17 is an example from the Long Mynd, stand 18 from Corndon Hill, stand 19 on Stapeley Hill; similar stands were recorded at Cramer Gutter on Catherton Common and in the Oswestry Hills close to stand 16. These stands are mostly transitional with wet grassland, being distinguished mainly by the intensity of flushing and sometimes by the abandonment of grazing.

Table 5.1 next displays examples of Group 01, already described as being characterised by species such as common duckweed and common water-starwort, plants of more aquatic situations than the Group 00 indicators. Group 01 stands are generally in the margin of open water, but as may be seen from Table 5.1 a very wide range of ecological situations are included: standing and running water, and a range of base and plant nutrient situations. The examples may be referred to Types 5, 6, 7 and 8 in Section 5.1.

Lemna minor, Callitriche stagnalis

A number of stands in Group 00 are also from water margins: some (Group 000) represent extremely calcareous situations, others (Group 001) are mostly very base-poor and are typically from upland situations. Group 01 stands generally fall between these extremes.

Table 5.1 *Stand-species matrix for 42 of the open water and wetland plots, each of which had an area of four square metres. Cover abundance values (recorded on the Domin scale) are given for the species present. Symbol — indicates absence. Site locations and additional species are shown at the foot of the table.*

	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	POLYTHETIC DIVISIVE GROUP						000									001				
	Altitude (m)	75	122	70	229	180	213	98	155	213	137	98	510	488	375	230	400	475	366	305
	Aspect	—	—	—	—	WNW	NE	NW	ESE	—	—	—	E	ESE	WNW	—	—	S	NE	WSW
	Slope (°)	0	0	0	0	10	5	3	5-10	0	0	0	22	10	5	0	0	5	0-15	5
	Soil pH	6·5	6·0	6·5	5·4	6·7	6·3	7·2	7·3	7·5	7·0	7·5	6·1	4·6	5·0	5·0	5·6	5·4	4·4	5·9
1	*Equisetum arvense*	—	—	—	—	2	1	1	—	1	3	—	1	—	—	2	—	—	—	2
2	*E. fluviatile*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
3	*E. palustre*	—	—	2	—	—	—	—	2	—	1	—	—	—	—	—	—	—	—	—
1	*Agrostis canina*	—	—	—	—	—	—	—	—	—	—	—	—	1	—	5	—	—	—	—
2	*A. capillaris*	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	*A. stolonifera*	7	4	5	—	5	5	6	—	4	2	—	3	4	4	—	3	1	—	3
4	*Ajuga reptans*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—
5	*Alisma plantago-aquatica*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	*Alopecurus geniculatus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
7	*Anagallis tenella*	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	—	—	—
8	*Andromeda polifolia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	*Angelica sylvestris*	—	—	—	2	—	2	—	—	1	1	—	—	—	—	—	—	—	—	—
10	*Anthoxanthum odoratum*	—	2	2	1	2	1	—	—	—	—	—	—	1	2	5	2	—	—	4
11	*Berula erecta*	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	*Betula pubescens*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13	*Bidens cernua*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14	*Briza media*	—	—	1	—	2	—	3	—	3	—	—	—	—	—	—	—	—	—	—
15	*Callitriche stagnalis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	*Calluna vulgaris*	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—
17	*Caltha palustris*	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—
18	*Cardamine flexuosa*	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—
19	*C. pratensis*	—	2	1	—	—	2	—	—	—	1	—	—	—	—	—	—	1	—	2
20	*Carex demissa*	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	4
21	*C. dioica*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22	*C. echinata*	—	—	—	—	—	—	—	—	—	—	—	—	3	2	—	3	1	2	5
23	*C. flacca*	—	—	—	—	4	—	2	3	2	—	—	3	—	—	—	—	—	—	—
24	*C. hirta*	—	4	—	—	3	2	—	—	—	—	—	—	—	—	—	—	—	—	—
25	*C. hostiana*	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	2	3
26	*C. nigra*	—	2	—	—	—	2	3	—	—	—	—	—	4	1	4	—	1	—	4
27	*C. panicea*	—	—	—	—	3	1	2	4	4	—	—	—	1	—	3	—	4	—	2
28	*C. pseudocyperus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
29	*C. pulicaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	*C. rostrata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	—	—	—
31	*Centaurea nigra*	—	—	3	—	—	2	1	2	—	—	1	—	—	—	—	—	—	—	—
32	*Cerastium fontanum*	—	1	—	1	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—
33	*Cirsium arvense*	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—
34	*C. palustre*	3	—	2	—	—	1	1	1	1	2	—	3	—	—	1	—	—	1	2
35	*Cynosurus cristatus*	—	1	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36	*Dactylis glomerata*	—	—	1	4	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
37	*Dactylorhiza fuchsii*	—	—	—	—	1	2	—	—	2	1	—	—	—	—	—	—	—	1	—
38	*Deschampsia cespitosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—
39	*Drosera rotundifolia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		3
40	*Eleocharis palustris*	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—		—	—
41	*Empetrum nigrum*	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
42	*Epilobium ciliatum*	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
43	*E. palustre*	—	—	—	—	—	—	—	—	—	—	—	3	—	—	1	—	1	—	2
44	*Erica tetralix*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
45	*Eriophorum angustifolium*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
46	*E. vaginatum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
47	*Festuca ovina*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—
48	*F. pratensis*	—	1	—	—	—	2	—	—	—	—	2	—	—	—	—	—	—	—	—
49	*F. rubra*	—	3	2	—	—	4	6	2	5	—	3	2	—	—	3	—	—	—	—
50	*Filipendula ulmaria*	—	—	4	7	—	1	—	—	—	7	7	—	—	—	—	—	—	—	—
51	*Galium palustre*	1	1	2	—	2	2	—	—	—	—	—	—	—	—	3	—	—	—	—
52	*G. uliginosum*	—	—	—	—	—	4	2	—	—	—	4	—	—	—	—	—	—	—	—
53	*Glyceria declinata*	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
54	*G. fluitans*	2	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
55	*G. maxima*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
56	*Holcus lanatus*	5	4	3	4	3	3	2	—	—	—	—	1	—	2	—	—	—	1	5
57	*Hydrocotyle vulgaris*	—	—	—	—	—	4	2	—	2	—	—	—	—	—	—	—	3	—	—
58	*Hypericum tetrapterum*	3	—	—	—	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—
59	*Iris pseudacorus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	*Isolepis setacea*	—	—	—	—	1	—	3	—	—	—	—	—	—	—	—	—	2	—	—
61	*Juncus acutiflorus*	—	—	4	—	—	7	1	—	—	7	—	—	—	5	3	4	—	5	—
62	*J. articulatus*	—	—	—	—	2	—	5	—	4	—	—	—	6	—	—	—	—	—	—
63	*J. bulbosus*	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	3	—	—
64	*J. conglomeratus*	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	4	—
65	*J. effusus*	4	4	—	—	—	—	—	—	—	—	—	5	2	4	5	—	4	—	4
66	*J. inflexus*	—	5	—	—	5	—	—	3	—	1	—	—	—	—	—	—	—	—	—
67	*Lathyrus pratensis*	—	—	3	3	—	1	—	—	—	1	3	—	—	—	2	—	—	—	—
68	*Lemna minor*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
69	*L. trisulca*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
70	*Lotus uliginosus*	2	4	3	2	—	2	2	1	—	—	2	—	—	—	3	—	2	4	4

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
010										011							10				11		
105	325	303	103	103	90	122	103	75	75	450	150	103	42	42	67	102	90	90	76	90	103	215	
—	WNW	—	NNW	WNW	—	—	WSW	—	ENE	—	—	SSW	ESE	—	—	—	—	—	—	—	—	—	
0	3-5	0	5	5	0	0	90	0	0-5	0	0	5	5-20	0	0	0	0	0	0	0	0	0	
4·8	5·3	4·9	5·8	6·2	5·6	5·8	5·8	5·9	4·2	5·5	4·2	5·8	6·7	7·0	6·9	6·4	3·9	3·2	3·8	4·1	4·3	5·8	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	1	—	1	3	3	—	—	—	—	—	4	—	—	—	—	—	—	2
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
8	2	—	1	—	—	2	7	—	6	1	—	5	6	4	—	—	—	—	—	—	—	—	3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
—	—	—	—	—	—	—	—	—	4	—	—	2	—	5	—	1	—	—	—	—	—	—	5
—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	6
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4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10
—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	4	—	—	—	—	—	—	—	11
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	—	—	2	—	12
—	—	—	2	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	9	—	—	—	16
—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17
—	—	—	—	—	3	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18
—	—	—	—	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—	—	—	—	19
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	21
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	22
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23
—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	24
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	25
—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	26
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	27
—	—	—	1	3	—	—	—	—	2	—	—	2	—	—	—	—	—	—	—	—	—	—	28
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	29
—	—	—	2	3	—	—	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	30
—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32
—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33
3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	34
—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	36
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	37
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	3	3	1	39
—	—	—	3	—	—	—	—	—	—	5	—	4	—	—	—	—	—	—	—	—	—	—	40
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	41
—	—	—	—	—	—	—	5	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	42
3	—	3	1	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	4	3	—	3	44
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	—	6	4	2	45
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	1	—	—	—	46
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49
—	—	—	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50
3	3	2	4	—	2	—	4	3	2	1	—	—	—	—	—	—	—	—	—	—	—	—	51
—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	52
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—	—	—	—	—	—	—	—	—	—	—	3	2	—	5	—	—	—	—	—	—	—	—	54
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—	—	—	—	—	—	—	4	3	—	—	—	—	—	3	—	—	—	—	—	—	—	—	56
2	2	4	2	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	58
4	—	—	—	—	—	3	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	59
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60
—	—	—	—	—	—	4	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	1	61
—	—	—	—	—	—	—	—	—	—	3	—	4	—	—	—	—	—	—	—	—	—	5	62
—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	3	4	63
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	64
1	6	—	8	—	—	2	7	6	6	4	1	—	—	1	—	—	—	—	—	—	2	—	65
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	67
—	—	—	2	2	—	—	—	1	—	—	—	1	2	5	3	4	—	—	—	—	—	—	68
—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	69
—	—	—	—	—	—	2	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	70

71	*Lychnis flos-cuculi*	—	2	—	—	—	2	1	—	—	3	—	—	—	—	—	—	—	—	—
72	*Lycopus europaeus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
73	*Lysimachia nummularia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
74	*Lythrum portula*	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—
75	*Mentha aquatica*	2	—	—	—	3	3	3	1	2	—	2	—	—	—	—	—	—	—	4
76	*M. arvensis*	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
77	*Menyanthes trifoliata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—
78	*Molinia caerulea*	—	—	2	—	—	—	—	—	—	—	4	—	—	—	—	—	—	6	—
79	*Myosotis laxa* ssp. caespitosa	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—
80	*M. scorpioides*	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—
81	*Nardus stricta*	—	—	—	—	—	—	—	—	—	—	—	4	—	4	—	—	—	—	—
82	*Narthecium ossifragum*	—	—	—	—	—	—	—	—	—	—	—	—	5	2	—	—	—	—	—
83	*Oenanthe aquatica*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
84	*O. fistulosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
85	*Phalaris arundinacea*	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
86	*Pinguicula vulgaris*	—	—	—	—	—	—	—	3	3	—	—	—	—	—	—	—	—	—	—
87	*Plantago lanceolata*	—	—	—	—	2	2	—	—	—	—	1	—	—	—	—	—	—	—	—
88	*Poa trivialis*	—	4	—	—	4	3	—	—	—	2	4	—	—	—	—	—	2	—	—
89	*Polygonum amphibium*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
90	*Potamogeton natans*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
91	*P. polygonifolius*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	4
92	*Potentilla erecta*	—	—	2	—	—	—	—	—	—	—	—	3	—	2	—	—	—	3	—
93	*P. palustris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
94	*Prunella vulgaris*	—	—	1	—	2	—	2	—	—	—	—	—	—	—	—	—	—	—	—
95	*Ranunculus acris*	—	1	—	—	2	3	—	—	—	1	1	—	—	—	—	—	—	—	—
96	*R. aquatilis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
97	*R. flammula*	—	—	3	—	—	1	2	—	—	—	—	2	—	—	4	1	—	—	3
98	*R. repens*	3	2	2	—	4	—	3	—	—	—	—	—	—	—	2	—	1	—	1
99	*Rubus fruticosus* agg.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
00	*Rumex acetosa*	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—
01	*Salix cinerea*	—	—	—	s	—	—	—	—	2	—	—	1	—	—	—	—	—	—	—
02	*Solanum dulcamara*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
03	*Sparganium erectum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
04	*Stellaria alsine*	—	4	—	—	—	2	—	—	—	—	—	—	—	—	—	—	1	—	—
05	*Succisa pratensis*	—	—	—	1	—	2	2	3	2	—	—	—	—	—	—	—	—	2	2
06	*Trifolium pratense*	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
07	*T. repens*	—	1	—	—	—	—	2	—	—	—	—	—	—	—	—	—	2	—	—
08	*Triglochin palustris*	—	—	2	—	—	2	4	1	1	—	—	—	—	—	—	—	—	—	1
09	*Typha latifolia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	*Vaccinium oxycoccus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11	*Valeriana dioica*	—	—	—	—	—	3	3	3	2	6	4	—	—	—	—	—	—	—	—
12	*Veronica beccabunga*	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
13	*Viola palustris*	—	—	—	—	—	—	—	—	—	—	—	—	4	3	—	—	—	2	—
	SPECIES PER STAND	14	23	27	16	28	41	34	24	23	20	21	19	13	15	19	8	28	15	26
	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

GROUP 000

1 Field drainage ditch at Stockton Moors, near Newport. National Grid Ref. SJ 784169. Coarse peat over glacial deposits. (*Hypericum tetrapterum* 3).
2 Silted-up pond in improved pasture, Diddlebury, Corvedale. SO 512855. Medium clay. (*Glyceria plicata* 3).
3 Field drainage ditch in ancient wet meadow, Morton Pool, near Oswestry. SJ 300239. Peat. (*Carduus acanthoides* 1, *Primula veris* 1, *Viola riviniana* 1).
4 Ungrazed marshy area by minor road, Lower Netchwood, near Bridgnorth. SO 625919. Clay. (*Achillea ptarmica* 2, *Holcus mollis* 4, *Pulicaria dysenterica* 5, *Rumex conglomeratus* 1, *Stellaria graminea* 1).
5 Spring in old meadow, Stoke St. Milborough, Brown Clee. SO 517809. Clay loam. (*Fraxinus excelsior* seedling 1, *Holcus mollis* 3, *Pulicaria dysenterica* 4, *Rhinanthus minor* 2, *Vicia sativa* 1).
6 Tall fen, Trefonen, near Oswestry. SJ 22. Loam. (*Carduus acanthoides* 1, *Cirsium vulgare* 1, *Epilobium parviflorum* 2, *Phleum pratensis* 3, *Trollius europaeus* 4).
7 Grazed fen in lake margin, Crosemere, near Ellesmere. SJ 434304. Peat. (*Carex lepidocarpa* 2, *Epilobium parviflorum* 2, *Juncus subnodulosus* 4, *Parnassia palustris* 2, *Phragmites australis* 2).
8 Base-rich flush, Shirlett, near Bridgnorth. SO 6597. Sandy clay loam. (*Dactylorhiza* sp.2, *Eleocharis quinqueflora* 1, *Epipactis palustris* 3 *Eriophorum latifolium* 5, *Eupatorium cannabinum* 4, *Euphrasia* sp.2, *Fraxinus excelsior* seedling 1, *Leontodon hispidus* 2, *Linum catharticum* 3).
9 Short fen, Trefonen, near Oswestry. SJ 22. Humose sandy loam. (*Carex lepidocarpa* 3, *Crepis paludosa* 3, *Eriophorum latifolium* 3, *Linum catharticum* 2, *Parnassia palustris* 3).
10 Tall fen, Sweeney Fen, near Oswestry. SJ 275251. Peat. (*Carex acutiformis* 1, *Epipactis palustris* 3, *Eupatorium cannabinum* 3, *Geum rivale* 4, *Valeriana officinalis* 1).
11 Tall fen in lake margin, Crosemere, near Ellesmere. SJ 434305. Peat. (*Agrimonia eupatoria* 1, *Dactylorhiza majalis* ssp. *praetermissa* 2, *Juncus subnodulosus* 4, *Phragmites australis* 3, *Sonchus arvensis* 2, *Stachys palustris* 2, *Vicia cracca* 2).

GROUP 001

12 Lake Kilowatt margin, Brown Clee. SO 596866. Loam. (*Rumex* sp.1, *Poa pratensis* 2).
13 Acid flush, Stiperstones. SO 369979. Peat.
14 Cuscote bog, Stapeley Hill, near Priest Weston. SO 311987. Humose loam. (*Galium saxatile* 3, *Scutellaria minor* 3, *Trisetum flavescens* 1).
15 Marshy area by stream, Paulith Bank, Westcott near Pontesbury. SJ 396008. Clay loam. (*Carex ovalis* 1).
16 Valley bog, near Oswestry, Denbighshire. SJ 22 34 Peat. (*Carex curta* 4).
17 Flush at source of stream, Boiling Well, Long Mynd. SO 422945. Humose clay loam. (*Callitriche platycarpa* 4, *Eleocharis quinqueflora* 1, *Epilobium* sp.1, *Montia fontana* 5, *Myosotis secunda* 2, *Poa annua* 2, *Ranunculus hederaceus* 2, *Sagina procumbens* 4, *Veronica serpyllifolia* 1).
18 Marshy field, Corndon Hill, near Priest Weston, Montgomeryshire. SO 31 97. Sandy clay loam. (*Equisetum sylvaticum* 2, *Danthonia decumbens* 3, *Luzula multiflora* 2).
19 Flush near Mitchell's Fold, Stapeley Hill, near Priest Weston. SO 302986. Humose loam. (*Bellis perennis* 1, *Carex demissa x hostiana* 2, *Juncus acutiflorus x articulatus* 6, *Pedicularis palustris* 3).

GROUP 010

20 Marsh to the south of the Mere, Ellesmere. SJ 409343. Peaty loam. (*Dryopteris carthusiana* 1, *Rumex* sp.3).
21 Marsh in lake margin, Llyn Rhuddwyn, near Oswestry. SJ 233288. Humose loam. (*Apium inundatum* 3, *Callitriche brutia* 2, *Littorella*

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15	13	8	18	10	17	19	16	20	14	17	8	20	16	11	9	8	8	9	5	8	6	23	
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

uniflora 5, *Mentha × verticillata* 3, *Peplis portula* 6, *Veronica scutellata* 3).

22 Marsh in lake margin, Shelve Pool, near Stiperstones. SO 334979. Peat. (*Carex curta* 4).

23 Margin of shallow pond, Brown Moss, near Whitchurch. SJ 563396. Humose sandy brown soil. (*Eleogiton fluitans* 4, *Hottonia palustris* 2, *Potentilla anserina* 2).

24 Margin of another shallow pond, Brown Moss, near Whitchurch. SJ 565394. Very humose, slightly sandy soil. (*Sparganium minimum* 3, *Veronica scutellata* 3).

25 Alder carr, Colemere, near Ellesmere. SJ 437332. Humose silt. *Alnus glutinosa* seedling 3, *Dryopteris dilatata* 2, *Epilobium montanum* 2, *Lonicera periclymenium* 1, *Lysimachia vulgaris* 3, *Ranunculus omiophyllus* 1, *Rumex sanguineus* 2, *Scutellaria galericulata* 1, *Urtica dioica* 4).

26 Ditch in water meadow, near Leintwardine, Herefordshire. SO 394740. Clay loam. (*Carex disticha* 4, *Carex riparia* 3, *Scutellaria galericulata* 2, *Senecio aquaticus* 1).

27 Bank of pool in farmland, Ebnal Pool, near Oswestry. SJ 313344. Silty clay. (*Alnus glutinosa* seedling 1, *Rumex maritimus* 2).

28 Canal margin, Shropshire Union Canal at Red Bridge, near Welshpool, Montgomeryshire. SJ 251140. Somewhat humose loam. (*Acorus calamus* 2).

29 Very shallow pool in farmland, Red Bridge, near Welshpool, Montgomeryshire. SJ 252139. Humose clay loam. (*Bidens tripartita* 2, *Rumex hydrolapathum* 1, *Stellaria palustris* 2).

GROUP 011

30 Reedswamp, Wildmoor Pool, Long Mynd. SO 425965. Partially decomposed plant remains. (*Montia fontana* 2).

31 Shallow pool, Old Oswestry Iron age fort, Oswestry. SJ 294309. Sandy clay loam.

32 Margin of large shallow pool, Brown Moss, near Whitchurch. SJ 562397. Humose sandy loam. (*Alopecurus aequalis* 5, *Potentilla anserina* 2, *Rumex crispus* 2).

33 Bank of River Severn at Buildwas, near Ironbridge. SJ 638045. Clay loam. (*Atriplex patula* 2, *Brassica nigra* 4, *Butomus umbellatus* 1, *Conium maculatum* 1, *Myosoton aquaticum* 2, *Myriophyllum spicatum* 1, *Polygonum hydropiper* 4, *Polygonum lapathifolium* 1, *Polygonum persicaria* 4, *Rorippa amphibia* 4, *Sonchus oleraceus* 1).

34 Drained old canal, Coalport, near Ironbridge. SJ 695025. Clay. (*Epilobium* sp.2, *Lolium perenne* 2, *Poa annua* 2, *Ranunculus sceleratus* 3).

35 Canal bank, Newport Canal, Newport. SJ 745194. Sandy loam with shell fragments. (*Callitriche* sp.1, *Elodea canadensis* 5, *Hydrocharis morsus-ranae* 6, *Ranunculus circinatus* 1).

36 Reservoir margin, Castle Pool, Telford. SJ 684058. Clay loam. *Epilobium hirsutum* 4, *Nasturtium officinale* 2).

GROUP 10

37 Clarepool Moss, near Ellesmere. SJ 435343. Peat.

38 Relatively dry, uncut part of Whixall Moss, near Wem. SJ 475359. Peat. (*Quercus robur* seedling 1, *Rhynchospora alba* 4).

39 Wet heath, Hodnet Heath. SJ 621261. Peat. (*Pinus sylvestris* 1).

40 Bog pool, Wem moss, near Wem. SJ 474345. Peat. (*Drosera anglica* 2, *Rhynchospora alba* 3).

GROUP 11

41 Miniature quaking bog, Brown Moss, near Whitchurch. SJ 562395. Peat.

42 Flushed area by stream, Cramer Gutter, Catherton Common, Titterstone Clee. SO 646794. Silty peat. (*Dactylorhiza maculata* ssp. *ericetorum* 1, *Hypericum maculatum* 1, *Ulex gallii* 3).

Within Group 01 the aquatic bias is stronger in Group 011 with floating pondweed as the indicator. Group 010 has a range of marsh species as indicators. The division here is not, however, very strongly associated with hydroseral succession: both groups include stands which could be described as representing reedswamp communities as well as representatives of much drier marsh communities.

Potamogeton natans

Stands 20–24 represent Group 0100 in the analysis. The indicators for this group are marsh cinquefoil, marsh pennywort, and bottle sedge. Of the indicators for Group 0101, water forget-me-not, common water starwort, and creeping-Jenny, though diverse, are all characteristic of rather more nitrogen-rich situations than the 0100 indicators (Ellenberg 1979); certainly there is a more agricultural look to the 0101 stands. Otherwise the groups are very diverse, being referable to vegetation types 6, 7 and 8 described in Section 5.1.

Group 0100 indicators
Potentilla palustris, Hydrocotyle vulgaris, Carex rostrata
Group 0101 indicators
Myosotis scorpioides, Callitriche stagnalis, Lysimachia nummularia, Juncus acutiflorus

Within Group 0100 stand 20 represents an extensive ungrazed marsh on the southern margin of the Mere, Ellesmere. The low soil pH (4.8), and the presence of common cottongrass and to some extent of narrow buckler-fern and marsh violet suggest that perhaps the marsh is losing contact with the base-rich groundwater of the mere and becoming ombrogenous (derived directly from rainwater). Stand 21 is an upland lake shore with a fairly inorganic soil, and is much more subject to inundation than Stand 20. Stand 22 is a very different upland lake margin with a semi-floating mat of *Sphagnum* moss bearing mostly species characteristic of base-poor reedswamp and marsh. Stands 23 and 24 are two examples of the fascinating marginal vegetation which has developed around a number of shallow pools at Brown Moss. The water in the pools, which are surrounded by acid heathland, has a high base status and a pH of 6.0–7.5. The water level fluctuates strongly and the most marginal vegetation is therefore periodically flushed with base-rich water. As a result the vegetation includes mesotrophic marsh species such as marsh pennywort and marsh cinquefoil, plus species with much higher base requirement such as cyperus sedge and water-violet. Also represented are species tolerant of frequent inundation and exposure such as amphibious bistort, floating clubrush and nodding bur-marigold. Not all these pools are base-rich: one (see Stand 41) is a miniature *Sphagnum* bog.

Eriophorum angustifolium, Dryopteris carthusiana, Viola palustris

Hydrocotyle vulgaris, Potentilla palustris

Carex pseudocyperus, Hottonia palustris

Polygonum amphibium, Eleogiton fluitans, Bidens cernua

Stands forming Group 0100 largely conform to Type 8 communities as described in Section 5.1. Further similar stands occur in Group 0110 which is described later and forms a rather wetter parallel with Group 0100.

Group 0101, although containing stands which all reflect a higher nitrogen status than group 0100, is otherwise highly diverse. Stand 25, from an extensive alder carr to the east of Colemere in which the elongated sedge still persists, was included in the analysis to form a bridge with the alder carrs described in chapter 7. Stands 26, 27 and 29 are all representative of wetlands somewhat affected by agricultural use; the disused canal represented by Stand 28 is equally clearly rich in plant nutrients.

Carex elongata

Other species with a high nitrogen requirement (Ellenberg 1979) in these stands include wood dock, common nettle, yellow Iris, golden dock, and lesser water-parsnip. A similar but more terrestrial group of stands is Group 0000 (Stands 1–6), while most of the Group 0101 stands are similarly best referred to the Type 6 communities described in Section 5.1. Stand 27 is a farm pond which was probably once a marl pit, Stand 29 is a farm pool which appears to have formed naturally as a consequence of inefficient field drainage and is notable for one of the most westerly occurrences of marsh stitchwort in the Welsh borders. The pH for stand 29 appears to be anomalously low.

Rumex sanguineus, Urtica dioica, Iris pseudacorus, Rumex maritimus, Berula erecta

Stellaria palustris

Stand 28 represents the marginal vegetation of an astonishingly species-rich disused canal, and must clearly be referred to Type 7 in Section 5.1.

Group 011 has as its indicator floating pondweed, and is clearly a group of stands very similar to Group 010, but with a rather higher proportion of submerged and floating aquatic species. The group is subdivided in a similar way to Group 010, Group 0111 indicators including water-plantain and branched bur-reed, both characteristic of nitrogen-rich habitats.

Potamogeton natans

Group 0111 indicators
Sparganium erectum, Phalaris arundinacea, Lemna minor, Alisma plantago-aquatica

All three stands forming Group 0110 are wetlands surrounded by heathy areas – Wildmoor pool, stand 30, on the Long Mynd plateau; stand 31 one of a

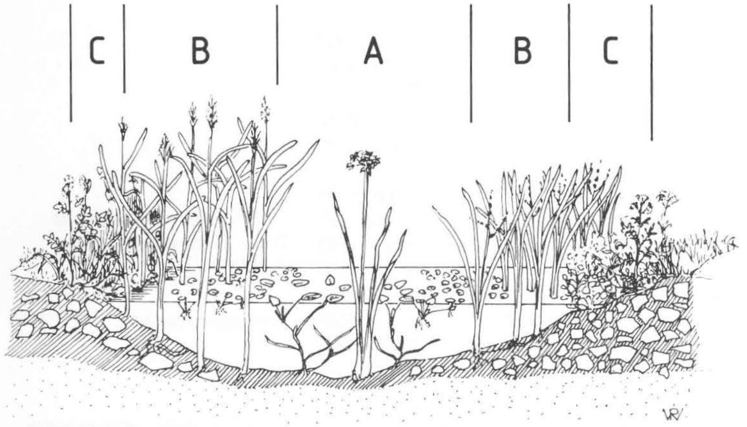


Figure 5.5 *Schematic section across disused canal, not to scale, showing most conspicuous plants in each depth zone. A: Aquatic zone in middle, with* Potamogeton natans, Hydrocharis morsus-ranae, Butomus umbellatus; *B: swamp zone with* Glyceria maxima *(on left),* Sparganium erectum *(on right),* Hydrocharis; *C: marsh zone with varied flora including* Berula erecta, Mentha aquatica, Galium palustre, Filipendula ulmaria, Agrostis stolonifera. *(Based on Twigg 1959).*

rather puzzling series of depressions in the heathy vegetation of the huge Iron Age camp at Old Oswestry; and stand 32, another example of water margin vegetation at Brown Moss. Members of Group 0111 all receive inputs of plant nutrients. Stand 33 is a stand from the steep banks of the river Severn which periodically receives inputs of nutrient-rich silt from flood water and fertilisers leached from the surrounding arable land. The flora includes many agricultural weeds as well as wetland species and aquatics, and the occurrence of black mustard, water chickweed, flowering-rush and (nearby) purple loosestrife may be seen repeated on the Clun, the Onny and the Camlad wherever they traverse agricultural land.

Group 0110 indicators
Juncus articulatus, Eleocharis palustris, Ranunculus repens

Brassica nigra, Myosoton aquaticum, Butomus umbellatus, Lythrum salicaria

The drained canal at Coalport (stand 34) suffers from domestic rather than agricultural inputs of plant nutrients, and this might also be true of stand 35 from the canal at Newport, although this fragment of a side-arm of the Shropshire Union Canal supports many species very scarce in the region such as frogbit, fan-leaved water-crowfoot, and arrowhead. Stand 36 is from a much-fished, disused industrial reservoir in an urban area, and receives plant nutrients from polluted drains and dumped rubbish.

Hydrocharis morsus-ranae, Ranunculus circinatus, Sagittaria sagittifolia

The remaining stands in Table 5.1 constitute Group 1, already characterised as representing oligotrophic peatlands and the margins of associated open water. As previously stated in Section 5.1, these kinds of habitat are represented in the Shropshire region by the raised bogs and basin mires of the north Shropshire mosses and by acid valley bogs occurring in a few other parts of the region.

These communities are not species-rich and the indicators for this group: cross-leaved heath, common and hare's-tail cottongrasses, bog-rosemary, round-leaved sundew, purple moor-grass, downy birch and Scots pine give a reasonable impression of the vascular plant flora. In the present study only eight stands form group 1, so that it is not possible to place a great deal of emphasis on the subdivision of the group.

Erica tetralix, Eriophorum angustifolium, Eriophorum vaginatum, Andromeda polifolia, Drosera rotundifolia, Molinia caerulea, Betula pubescens, Pinus sylvestris

Stand 37 is taken from an oligotrophic *Sphagnum* lawn from the basin mire at Clarepool Moss. Peat borings here have demonstrated a layer of Rannoch-rush rhizomes. This species is now extinct in England but was recorded from here and two other Shropshire stations in the mid-nineteenth century. Since that time there has clearly been considerable fluctuation in water level and quality and the central pool is now quite base-rich and is only bordered by floating *Sphagnum* to the west. Bog sedge has its only Shropshire station here and there are also peat workings with great sundew.

Sphagnum rubellum, Sphagnum recurvum

Scheuchzeria palustris

Carex limosa

Drosera anglica

Stand 38 represents a relatively unworked part of Whixall Moss, which with Fenn's Moss over the border in Clwyd forms a huge area of raised bog about 6km × 3km. Most of the area is worked commercially for its peat. There is also a car breaker's yard. Stand 39 is from an interesting piece of wet heathland on a perched watertable near Hodnet. Stand 40 is from the most undisturbed example of a raised bog in Shropshire, Wem Moss. Wem Moss is actually a lobe extending south from the Whixall peat basin, and stand 40 represents a hollow in the main peat surface which otherwise has a fairly uniform flora dominated by ling and cross-leaved heath. All three British species of sundew occur here; the oblong-leaved, and particularly the great sundew, are largely restricted to wet hollows similar to that sampled in stand 40. Stand 41 is from the most nutrient-poor of the Brown Moss pools, where a shallow depression has become completely grown over by a floating *Sphagnum* lawn. Stand 42 has already been described as intermediate between Group 0 and 1. From Cramer Gutter, which drains Catherton Common, it represents an only moderately base-poor valley mire and might have been better classified with Group 001. The vegetation is very varied; at the site of the stand samples it forms a matrix of purple moor-grass, flea sedge, cross-leaved heath, and *Sphagnum* hummocks interspersed with strongly flushed areas bearing tawny sedge, dioecious sedge and common yellow sedge.

Calluna vulgaris, Erica tetralix

Drosera rotundifolia, Drosera intermedia, Drosera anglica

Sphagnum recurvum

Molinia caerulea, Carex pulicaris, Erica tetralix

Carex hostiana, Carex dioica, Carex demissa

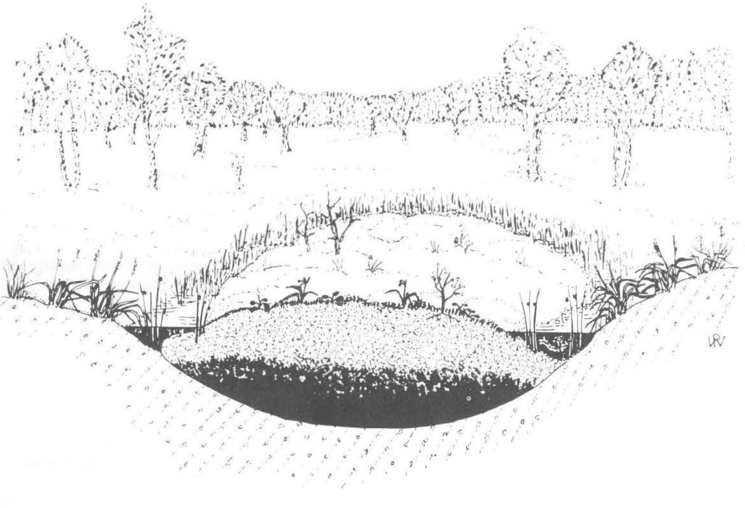
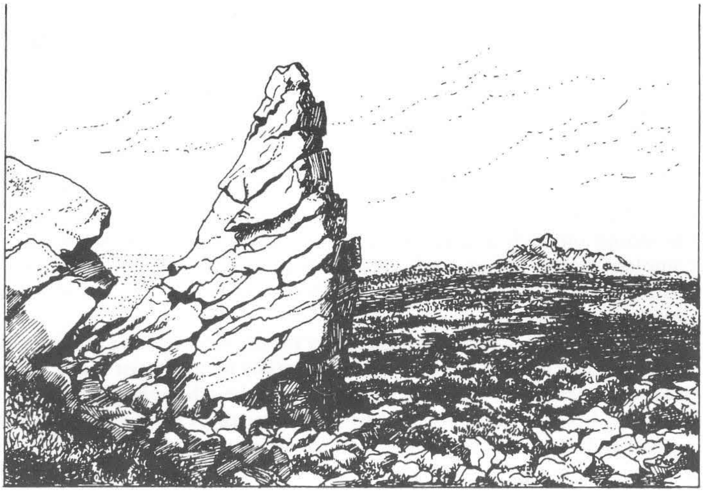


Figure 5.6 *Schematic section (not to scale) and view of a small quaking bog (Basin mire) at Brown Moss, SJ 565392, in 1958. The basin is a natural hollow in permeable fluvioglacial sands and gravels where the water table emerges above the mineral ground. The central raft of* Sphagnum recurvum, *about 1.5m thick, has free water beneath it; on its surface grow* Drosera rotundifolia, Eriophorum angustifolium *and seedlings of* Betula pubescens; *the birches die by drowning under their own weight as they grow. The peripheral 'moat' is occupied by* Juncus effusus *and* Sphagnum cuspidatum. *The grasses* Molinia caerulea *and* Deschampsia flexuosa *dominate the banks; heath and birchwood lie beyond.*

6 Rock, heath and grassland



Manstone Rock, summit of the Stiperstones ridge

6.1 Successions on various kinds of rock

White, orange, black and speckled, the enigmatic lichen-maps on hard rock surfaces tell slow sagas of two-dimensional wars. Crustose lichens may cover every square centimetre of the **surface of cliffs and boulders** which have been exposed to light and air for more than a few centuries. Adjacent patches of the same species meet in a battle zone marked by a straight black line; small discs and larger colonies with convex lobes show the victorious advance of a dominant species into the territory of a weaker neighbour, sometimes at rates of as much as 0.5mm per year.

If one scrapes the moistened surface of a lichen patch the green photosynthetic cells of the algal partner in the lichen are exposed, demonstrating that it is indeed a living surface. The symbiotic fungal partner provides the protective cover, often brightly coloured, as well as the fine threads which penetrate and corrode the crystals of the rock. Chemistry plays a vital part in biological weathering processes, and it is not surprising that the acid-soluble calcium carbonate of limestone is colonised by a completely different set of species from those which attack slates or igneous rocks, and that these in turn differ from the group which penetrate and disintegrate the bonded silica grains of sandstone or quartzite.

Communities of limestone lichens are well-represented on the small rock outcrops on **Llanymynech Hill**, and the west-facing cliffs of **Blodwel Rock** nearby. Here and there small, furry moss cushions cling to microscopic cracks, and golden-fringed mats of moss creep up the rock surface from the humid shelter of the turf at its base.

On flat **ledges** or slightly dished surfaces grow patches of moss which retain moisture for longer periods: a thin layer of blackish alkaline **humus-carbonate** soil accumulates under them. Although this skin may peel off and scalp the rock during a drought, in autumn and winter it forms a good seed bed for an attractive community of small **ephemeral** species – annuals such as parsley-piert and rue-leaved saxifrage – which do most of their active growth through the winter, flower in early spring and are dead by mid-summer but for the seeds which will produce the next generation. This is the drought-dominated pioneer phase of a succession on limestone, which can eventually lead to the development of a deep soil and woodland cover. A rare perennial on the edge of this open community is spring cinquefoil.

Lime-loving mosses grow in **cracks** in the **crags** and on the shaded **sides of boulders**, while several species of fern including wall-rue, maidenhair spleenwort, rustyback and hart's-tongue root in crevices of varying width; crevices and ledges also carry a specialised flora protected from grazing, culminating in the growth of trees such as English whitebeam and yew (see Fig. 7.4). The limestone uplands of the Oswestry area are still an excellent place for

TYPICAL SPECIES

1 Limestone outcrops

1a) Rock surfaces: *Lecanora calcarea, Caloplaca heppiana, Verrucaria* spp, *Grimmia pulvinata, Camptothecium sericeum*

1b) Ledges and soil pockets: *Encalypta vulgaris, Funaria muehlenbergii, Aphanes arvensis, Desmazeria rigida, Erodium cicutarium, Erophila verna, Saxifraga tridactylites, Torilis nodosa, Veronica arvensis, Potentilla tabernaemontani*

1c) Cliffs, crevices, boulders: *Ctenidium molluscum, Fissidens cristatus, Neckera crispa, Tortella tortuosa, Asplenium ruta-muraria, A. trichomanes, Ceterach officinarum, Cystopteris fragilis, Phyllitis scolopendrium, Polypodium cambricum, Arabis hirsuta, Rosa pimpinellifolia, Sorbus anglica, Taxus baccata*

studying the early stages of this succession, but at least three formerly-recorded species – Hutchinsia, limestone fern and stone bramble – have not been seen for many years.

1d) Extinct? *Hornungia petraea, Gymnocarpium robertianum, Rubus saxatilis*

Active screes, unconsolidated aggregations of angular stones, mantle the slopes of steep hillsides below cliffs and gullies still subject to frost-weathering. Particularly good examples of dolerite screes can be seen above the forestry road on the northern slopes of **Breidden Hill**. These screes lie at a steep angle of rest (between 30° and 35°), apparently stable until they are disturbed by the impact of a newly fallen stone or the feet of men or large animals. Like the cliffs above, the stones on such a scree are often exposed for long enough to acquire a complete lichen cover and even a few drought-resistant mosses. Their stabilisation, however, depends on the successful establishment of larger, deeper-rooted plants.

2 Active dolerite screes

This succession is typically initiated by the growth of young ash trees, whose seeds are large enough to germinate successfully in fine, moist soil at a depth of 30cm or more below the scree surface. When the ash sapling grows taller and begins to branch, nutrient-enriched rain water drips from it on to the stones immediately below, creating a local environment more favourable for the growth of mosses and flowering plants. False oat-grass, shining crane's-bill and herb Robert make their appearance. As the canopy of the ash tree spreads outwards, a luxuriant moss carpet follows it, sometimes bordered by festoons of polypody where the branches hang lowest and autumn leaf-fall accumulates (Fig. 6.1). Where the forestry track has cut sections through the scree it can be seen that the humus-rich soil under the moss carpet is often completely separate from the underlying mineral subsoil. The plants which take part in this special succession must therefore be tolerant of drought as well as shade, and the community is a distinctive one including succulent species such as rock stonecrop, orpine and navelwort. The trackside disturbance has also provided suitable pockets of soil among the stones for some uncommon plants including apple-moss and narrow-leaved bitter-cress.

2a) Primary colonisation: *Fraxinus excelsior*

2b) Consolidation: *Cladonia chlorophaea, Dicranum scoparium, Eurhynchium striatum, Isothecium myosuroides, Scapania gracilis, Thuidium tamariscinum, Arrhenatherum elatius, Fragaria vesca, Geranium lucidum, G. robertianum, Polypodium vulgare* agg, *Sedum forsteranum, S. telephium, Teucrium scorodonia, Umbilicus rupestris*

2c) Disturbance: *Bartramia pomiformis, Cardamine impatiens*

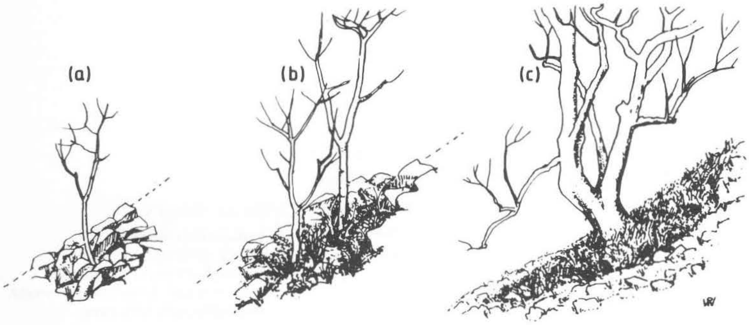


Figure 6.1 *Ash trees growing in coarse dolerite scree on the north slopes of Breidden Hill, SJ 297149, in February 1984. See text for details.*

Quartzite **tors** stand like broken teeth along the ridge of the **Stiperstones** – the product of intense frost-weathering during the Ice Age. The climate at that altitude (537m) is still very harsh and the rock itself is almost pure silica devoid of plant nutrients. The shattered boulders of the surrounding **blockfield** are nevertheless densely covered by a lichen patchwork as rich in species as the limestone on Llanymynech Hill. But this is only locally so: over much of the Stiperstones ridge uncontrolled moorland fires have removed the organic soil as well, laying bare large areas of white quartzite stones which have not yet had time to acquire a new lichen coat. Pioneer species dot their surfaces with small discs whose diameter is proportional to the time elapsed since burning.

3 Siliceous rocks

3a) Quartzite tors and boulders: *Lecidea* spp, *Parmelia furfuracea, P. multifida, Pertusaria corallina, Rhizocarpon geographicum, Cornicularia aculeata*

On the flanks of the ridge below the tors, especially west of Manstone Rock, the boulders have been sorted by complex periglacial frost-heaving processes into conspicuous **stone stripes**. The sketch (Fig. 6.2) shows an alternation of stripes of lichen-covered rock and of heather-covered soil with a narrow 'halo' of lichen-free stones (the burnt zone) between them. Under each stone stripe, at a

3b) Stone stripes: *Polytrichum piliferum, Vaccinium myrtillus, V. vitis-idaea, Calluna vulgaris, Deschampsia flexuosa*

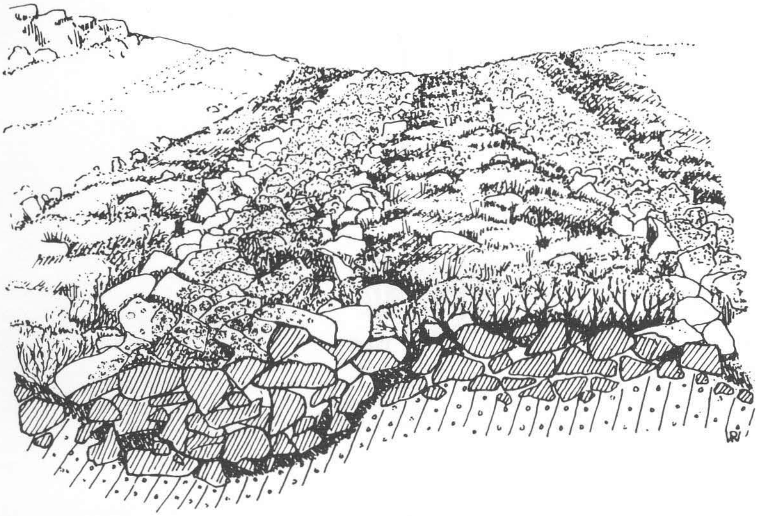


Figure 6.2 *Stone stripes near Manstone Rock, Stiperstones, SO 365986, looking E. See text for details.*

depth of half a metre or more, there is a compacted mineral subsoil with a thin layer of humus above it; subsoil and humus arch up to the surface in the vegetation stripes, although there is little apparent difference in the mean size of the stones themselves. Bilberry and cowberry, with their extensive rhizomes, are able to colonise places among the stones isolated from the risk of fire or grazing; heather and wavy hair-grass are restricted to the vegetation stripes.

Periglaciation was probably also responsible for the massive and completely stable dolerite **block screes** found on the upper northern and western slopes of **Titterstone Clee Hill** and on the eastern flank of **Corndon Hill.** These boulders, too, are almost completely covered by lichens and by mountain mosses with hair-pointed leaves. The distinctive feature of this inhospitable habitat is the surprising profusion of ferns to be found there, notably around the edges of each block scree where a garland of scaly male-fern marks the narrow zone between the sheep-grazed turf and the barren blocks. Parsley fern, oak fern and fir clubmoss are rarer species found in isolated soil pockets among the boulders, and a peculiar moss grows on the old bones of rabbits and other mammals which have met their fate in these bleak places. Even the wild uplands have not escaped change: alpine clubmoss, lesser twayblade and mossy saxifrage were formerly recorded but are now thought to be extinct.

3c) Dolerite blockfields: *Lecanora polytropa, Lecidea* spp, *Haematomma ventosum, Stereocaulon vesuvianum, Umbilicaria pustulata, Grimmia* spp, *Rhacomitrium heterostichum, R. lanuginosum, Dryopteris affinis, D. oreades, Athyrium filix-femina, Cryptogramma crispa, Gymnocarpium dryopteris, Huperzia selago, Tetraplodon mnioides*

3d) Extinct? *Diphasiastrum alpinum, Listera cordata, Saxifraga hypnoides*

The **steep,** south-eastern **slopes** of **Earl's Hill** (the Shropshire Trust for Nature Conservation's first nature reserve) are dominated by crags of dolerite and other igneous rocks. Active screes, however, are confined to a limited area, and over most of the slope the small stones have been stabilised by deep-rooting plants, notably wood sage with its wiry rhizomes, and by the slow accumulation of fine soil. Freely-drained and baked by the summer sun, these slopes provide a tough environment for plants; some cope with the problem by rooting deep in rock crevices (black spleenwort and navelwort); some have slender, hairy or wrinkled leaves to resist water loss (sheep's-fescue, mouse-ear hawkweed and foxglove); some have deep tap-roots like the cat's-ear. But here, as on the shallow ledges of limestone outcrops, one of the principal forms of protection is drought-avoidance. A group of **'thero-thermophilous'** species (warmth-loving winter annuals), including early hair-grass, small cudweed, changing forget-me-not and shepherd's cress flower and fruit in spring, passing the summer as dormant seeds. Experimental studies have shown that, for the first and last of these species at least, germination is triggered by a combination of a drop in temperature, a rise in soil moisture content and the lapse of a minimum period of several months to avoid premature leaf production.

4 Steep sunny slopes

4a) Crags and stable fine scree: *Polytrichum juniperinum, Teucrium scorodonia, Asplenium adiantum-nigrum, Umbilicus rupestris, Festuca ovina, Hieracium pilosella, Digitalis purpurea, Hypochoeris radicata, Agrostis capillaris, Carlina vulgaris, Hieracium acuminatum, H. lasiophyllum, Jasione montana*

4b) 'Thero-thermophilous': *Aira praecox, Aphanes microcarpa, Cerastium semidecandrum, Filago minima, Hypochoeris glabra, Myosotis discolor, Teesdalia nudicaulis*

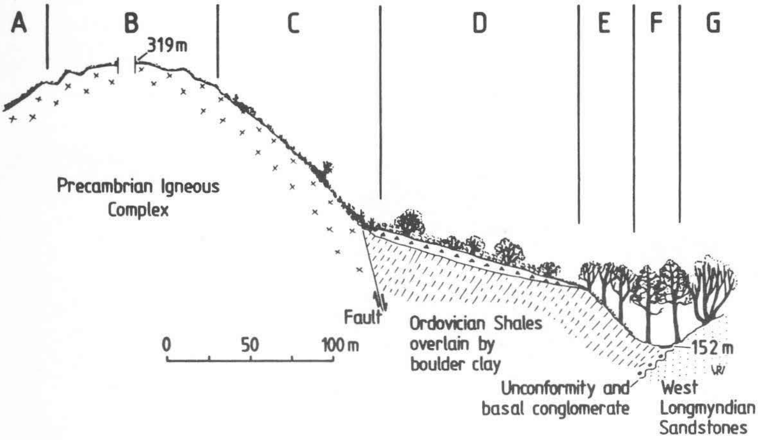

A
B
C
D
E
F
G
319m
Precambrian Igneous Complex
Fault
0
50
100m
Ordovician Shales overlain by boulder clay
152m
Unconformity and basal conglomerate
West Longmyndian Sandstones

Figure 6.3 *NW-SE section through Earls Hill and Habberley Brook, SJ 409047–412045, showing geology (simplified) and vegetation zones; the smaller part of the section, on the left, is displaced northward by c. 150m. A:* Vaccinium myrtillus *heath on shallow acid soil with mor humus; B: poor hill grassland with* Festuca ovina *and* Agrostis capillaris *on very shallow acid soil directly over rock; C: small outcrops of dolerite and fine scree stabilized by* Teucrium scorodonia *and other deep-rooted herbs (see text), on steep (30–35°) slope; D: bracken* (Pteridium aquilinum) *and mixed scrub on deep freely drained stony clay loam, formerly good pasture, gentler slope; E: mixed secondary woodland of* Fraxinus *and* Ulmus glabra *with* Mercurialis *on steep but poorly drained clay; F:* Alnus *woodland on alluvial flood zone along streamsides; G: Coppiced* Tilia platyphyllos–Quercus petraea *woodland (see Fig. 7.1).*

The rough hill pastures on Earl's Hill were ungrazed for several decades, and the thick mat of dead litter that developed became a **fire** hazard. Serious accidental fires occurred in the 1960s and early 1970s, as well as deliberate attempts at controlled moor-burning ('swaling'). Summer fires do more harm than winter ones, but regeneration is surprisingly swift: pioneer species such as sheep's sorrel and heath groundsel are quickly followed by fescue and bent-grasses to form a closed turf within a few years. In the absence of grazing, woody species become established and can lead via a scrub stage to a 'climax' of closed woodland (see Fig. 6.3). Grazing, mowing and fire create secondary or deflected successions (**plagioseres**) which culminate in grassland or heath.

Sheep-grazing has now been re-established as part of the management policy of the reserve. The sheep keep the turf short in general, but tend to avoid a few unpalatable species such as common ragwort and great mullein. **Rabbit warrens** and burrows are areas not only of concentrated grazing but also of raised soil fertility through the concentration of urine and droppings. On limestone hills, such spots are often marked by local clumps of hound's-tongue. On Earl's Hill and similar sites elsewhere in the region, the characteristic indicators include sticky mouse-ear, upright chickweed, annual meadow-grass and local thickets of elder. Rabbits were a much more significant factor before the lethal outbreak of **myxomatosis** in 1954/55, whose long-term effects have yet to be evaluated.

4c) Fire, sheep, rabbits and ant hills: *Rumex acetosella, Senecio sylvaticus, S. jacobaea, Verbascum thapsus, Cynoglossum officinale, Cerastium glomeratum, Moenchia erecta, Poa annua, Sambucus nigra, Thymus praecox, Veronica officinalis*

In old pastures at the foot of the slope there is a fine series of **ant hills** constructed by the yellow hill ant (*Lasius flavus*). On sunny days ant activity appears to be concentrated in the part of the hill facing the sun: the oldest ant hills are conspicuously elongated in a southerly direction. The area of maximum ant activity is often marked by a patch of wild thyme or heath speedwell, sometimes associated with winter annuals. The shady northern end of the ant hills is often moss-covered and may even bear a clump of heather.

Earl's Hill provides some of the most extensive and best examples of the vegetation types described here, not only in Shropshire, but on a national scale. Fragments of similar and related vegetation types are not uncommon in the upland parts of the region (Chapter 9). A notable example is a small rocky 'lump' near Priestweston where maiden pink flourishes with unmaidenly abandon.

Dianthus deltoides

In the shallow soil at the edge of similar basic rock outcrops a form of knawel has recently been found in two sites. It is distinct from both the annual and the perennial species and seems to be identical with *Scleranthus polycarpos*, a species recognised by continental botanists. **Dry grassy banks** exposed to the sun, but on relatively infertile soils, favour such plants as spreading bellflower, prickly sedge, lady's bedstraw, Smith's pepperwort, musk mallow, sand spurrey and knotted clover.

4d) **Dry grassy banks:** *Campanula patula, Carex muricata, Galium verum, Lepidium heterophyllum, Malva moschata, Spergularia rubra, Trifolium striatum*

The most celebrated botanical locality in the region is undoubtedly **Craig Breidden** (Sinker, 1970). It has been the site of several first records for rare species, including those by Edward Lhwyd for sticky catchfly, rock cinquefoil and spiked speedwell (Chapter 2); Babington was the first to recognise the plant now called *Hieracium peleteranum* (a large species of mouse-ear hawkweed). These plants grow on undisturbed and almost inaccessible sloping ledges on the south and south-west-facing dolerite crags, though not all together; subtle differences in their individual ecological needs apparently separate them. The rock cinquefoil is the rarest, having been reduced by covetous Victorian botanists and more recent quarrying to less than ten known plants. Quarrying has also severely reduced the population of the speedwell, which does not seem to regenerate freely by seed. Conservation measures for these and other rare plants on this important site are now in hand, thanks to the cooperation of the quarrying company, and preliminary ecological studies (Jarvis 1971, 1974; Jarvis and Pigott 1973) are being followed by more extensive experimental planting. Among the species thought to be extinct on Breidden are dropwort and alpine cinquefoil.

5 Craig Breidden
5a) **Rare and extinct species:** *Lychnis viscaria, Potentilla rupestris, Veronica spicata, Bartramia stricta, Frullania fragilifolia, Pterogonium gracile, Targionia hypophylla; Filipendula vulgaris, Potentilla crantzii*

Breidden has other ecological peculiarities in addition to the occurrence of rare flowering plants and bryophytes. The mineralogical constitution of the dolerite, which includes local veins and pockets of calcite, gives rise to soils which are favourable or tolerable to both **calcicole** and **calcifuge** species. Heathers and broom grow intermingled with bloody crane's-bill, common rock-rose, ploughman's-spikenard, marjoram and small scabious. Although these are dwarf shrubs or herbaceous plants of only moderate stature, they grow in communities which have more in common with open woodland than with pasture: the cliffs and their ledges are ungrazed, and bear a **mosaic** of natural **vegetation** types ranging from oakwood (or, in places, pinewood) through scrub and wood-edge communities to open swards of the thero-thermophilous type already described on Earl's Hill.

5b) **Calcifuge/calcicole & wood-edge:** *Calluna vulgaris, Erica cinerea, Cytisus scoparius, Geranium sanguineum, Helianthemum nummularium, Inula conyza, Origanum vulgare, Scabiosa columbaria*

The summit area of Breidden Hill probably receives significantly more rainfall than the lower slopes and it certainly has more strongly-leached soils and more deeply-weathered rock outcrops. English stonecrop is restricted to this part of the hill.

5c) **Summit area:** *Sedum anglicum*

A sunny lane-side bank at the south end of Breidden Hill carries an interesting community including wall whitlowgrass and hoary cinquefoil.

5d) **Lane-side bank:** *Draba muralis, Potentilla argentea*

Away from the ridge-top zone of tors and stone stripes, the **Stiperstones** moorland has a more continuous cover of vegetation, whose large-scale colour patchwork is the result of regular **grouse-moor** burning. After a successful late-winter burn, the first plant to regenerate is usually bilberry, whose young growth is a distinctive golden green. Heather overtakes the bilberry in both height and cover by about the third year after a burn. The vegetation is generally of the upland **dry heath** type, but somewhat richer in species, including numerous lichens, crowberry and common cow-wheat. At the points where livestock spread out from the confines of the banked tracks or 'driftways' on to the open moor there are extensive patches of western gorse.

6 Upland heath and moor
6a) **Dry heath:** *Vaccinium myrtillus, Calluna vulgaris, Cladonia* spp, *Empetrum nigrum, Melampyrum pratense, Ulex gallii*

The western flank of the Stiperstones is cut by several short deep valleys, of which **Perkins Beach** (Fig. 3.7) is a striking example. The south-facing valley-side has some similarity to the slopes of Earl's Hill described above, but its soil is more acid and the most conspicuous plant is bell heather. The **north-facing slope**, on the other hand, resembles a damp moorland in north-western Britain, with a number of drought-sensitive bryophytes as well as hard fern and stag's-horn clubmoss.

6b) **N-facing slopes:** *Diplophyllum albicans, Hylocomium splendens, Pleurozium schreberi, Ptilidium ciliare, Sphagnum* cf *quinquefarium, Blechnum spicant, Lycopodium clavatum*

The **'batches'** or hollows running south-eastwards on the **Long Mynd** are rather similar, though being part of a common which has suffered overgrazing by sheep for many years they have less heather on their sides and far more bracken and grass. The contrast between north-and south-facing slopes is as marked on the large scale as on the small. Uncommon oceanic liverworts, Wilson's filmy-fern and wood sorrel enjoy the moist cool climate on the shady side. Rare mosses and lichens are also a feature of some of the batches.

6c) Long Mynd 'batches': *Plagiochila spinulosa, Hymenophyllum wilsonii, Oxalis acetosella, Buxbaumia aphylla, Parmelia disjuncta*

The heads of stream valleys and poorly-drained hollows on the Long Mynd plateau and other upland parts of the region are picked out by clumps of compact rush and soft rush, both of which tolerate waterlogged soils but prefer the ground-water to be moving (see also Chapter 5). Damp areas of plateau with gley-podzol soils, where the water is more stagnant, are covered by wet heath with heath rush, green-ribbed sedge (an indicator of incipient podzolisation), pill sedge, cross-leaved heath, mat-grass and common hair-moss. **Damp heath** and **moor** tend to be visually monotonous and poor in species, but a close search of favourable areas can bring the reward of exciting discoveries – marsh gentian, for instance, or ivy-leaved bellflower. Another detail worth the botanist's scrutiny on these uplands is the entrance to sandy rabbit burrows: their dark, receding walls may be illuminated by the remarkable green fluorescence of the uncommon moss *Schistostega pennata*.

6d) Moor & damp heath: *Juncus conglomeratus, J.effusus, J.squarrosus, Carex binervis, C.pilulifera, Erica tetralix, Nardus stricta, Polytrichum commune, Gentiana pneumonanthe, Wahlenbergia hederacea*

On a clear day the view across the farmlands of the North Shropshire plain is broken by a series of low, dark-wooded **hills**, where New Red **Sandstone** breaks through the general cover of glacial drift. More scenically than botanically attractive, they are often crowned with woods of Scots pine so well established that it almost appears native. Nottingham catchfly is about the only rare plant to be looked for (at Hawkstone Park), though the delicate grace of climbing corydalis and trailing St John's-wort relieve the dullness of the forest floor. Little remains of the once numerous **lowland heaths** of north-east Shropshire, whose intensively managed sandy tracts now produce cereal and root crops (for their former character see Chapter 9).

7 Sandstone hills and lowland heath: *Pinus sylvestris, Silene nutans, Corydalis claviculata, Hypericum humifusum*

The small hedged fields of **Llynclys Hill** and neighbouring parts of the Oswestry uplands are as rich as any **limestone pastures** in the Midlands or the Welsh Marches. One of their surprising, and perhaps significant, features is the virtual absence of the major calcicole grass species found in other parts of Britain. Upright brome is rare in the Oswestry district while tor-grass, crested hair-grass, meadow oat-grass and blue moor-grass are completely missing from the grasslands of this region. Red fescue and quaking-grass take their places, with spring sedge and glaucous sedge. The orchid flora includes pyramidal, frog and greater butterfly orchids as well as other more widespread species. In summer the turf is bright with the flowers of yellow-wort, rock-rose, fairy flax, cowslip and salad burnet. A rare 'off-comer' from the north is mountain everlasting; the range of stemless thistle just extends into this region from the south. Woolly thistle penetrates the Shropshire region from the south only as far as the Wenlock Edge limestone, and hoary plantain is also strangely absent from the Oswestry uplands.

8 Limestone grassland
8a) Rare or absent grasses: *Bromus erectus, Avenula pratensis, Brachypodium pinnatum, Koeleria macrantha, Sesleria albicans*
8b) Grazed pasture: *Festuca rubra, Briza media, Carex caryophyllea, C.flacca, Anacamptis pyramidalis, Coeloglossum viride, Platanthera chlorantha, Blackstonia perfoliata, Helianthemum nummularium, Linum catharticum, Primula veris, Sanguisorba minor, Antennaria dioica, Cirsium acaule, C.eriophorum, Plantago media.*

One of the attractive features of limestone districts is the variety of species of tall herbs to be found in the **wood-edge zone** bordering paths or pastures and sometimes in ungrazed meadows. The typical grass is false brome, often growing with wild basil, lady's bedstraw, hairy St John's-wort, rough hawkbit, marjoram, hoary ragwort, zigzag clover and hairy violet. Pale St John's-wort is a less common associate.

8c) Meadow and wood-edge: *Brachypodium sylvaticum, Clinopodium vulgare, Galium verum, Hypericum hirsutum, Leontodon hispidus, Origanum vulgare, Senecio erucifolius, Trifolium medium, Viola hirta, Hypericum montanum*

Wenlock Edge and other limestone outcrops in the south-east of the region are more important today for their woods and quarries than their grasslands, most of which have been put under the plough.

The limestone pastures just described form one end of a continuum which grades almost imperceptibly into the acid upland grasslands discussed in the next section. In the computer analysis (6.2) Groups 0001 and 0010 contain examples of neutral or nearly neutral grasslands, many in hill country, which are more central to this continuum.

The steep, narrow humps of the Pre-Cambrian igneous hills, whose shapes lend such a distinctive personality to the landscape of the Shropshire Marches, are rather disappointing at close quarters to the botanist. Apart from the bilberry patches at the top of their north-western slopes, the ridges and flanks of the Wrekin, the Lawley, and other hills in the Caer Caradoc range, and even Earl's Hill, are covered with an **acid**, species-poor **grassland** in which common bent, velvet bent, sheep's-fescue and harebell are the most constant elements. Well trampled paths are often picked out by spreading meadow-grass.

Under the sheep-grazing regime which has prevailed since the agricultural recession between the Wars, bracken appears to have become much more extensive in the hills of the Shropshire region generally; the aggressive, arching lobes of its advancing front mark areas where primary invasion is still taking place from the deeper soils on the footslopes. Bracken can be controlled by chemical sprays and changes in husbandry, but the effort is seldom made except on the big enclosures of the 'prairie' farms which are managed by ploughing and reseeding (see Chapter 8).

9 Acid hill grassland

9a) Grazed dry pasture: *Agrostis capillaris, A.vinealis, Festuca ovina, Campanula rotundifolia, Poa subcaerulea, Pteridium aquilinum, Galium saxatile, Lathyrus montanus, Lotus corniculatus, Luzula campestris, Polygala serpyllifolia, Potentilla erecta, Veronica chamaedrys, Botrychium lunaria, Viola lutea, Platanthera chlorantha, Coeloglossum viride*

As recently as the late 1940s it was still possible to walk from the Long Mynd through Ratlinghope to Shelve and Bromlow Callow over a succession of large well-grazed fields whose ancient turf was rich in flowers; heath bedstraw, bitter-vetch, bird's-foot-trefoil, Good-Friday-grass, tormentil, heath milk-wort, germander speedwell, moonwort and the hauntingly beautiful mountain pansy were all common. Turf of this kind still occurs in a very few small crofts associated with miners' cottages and smallholdings; it is also found on parts of Offa's Dyke and other 'unimproved' banks in the Clun Forest, Clee Hills and Oswestry Uplands. It is easy to see how ploughing for the improvement of hill grasslands destroys this living museum, but it is much harder to determine precisely what form of management is best for maintaining it.

Some of the species listed (and other rare associates such as greater butterfly-orchid and frog orchid) are favoured by occasional applications of lime; it is unlikely that the former smallholders could have afforded to import lime from the distant lowlands. Is it possible that the abundant crystalline calcite in the spoil heaps from the mines was used as a local substitute? There is no direct evidence at present.

Where land drainage has not altered them, comparable **hill pastures** on heavy **damp soils** derived from shales or boulder clay are also rich in interesting species. They are closely related to the wet heath and valley mires described in Chapter 5 but grass-dominated and heavily grazed and trampled. Among the commoner characteristic plants are bugle, star sedge, carnation sedge and other sedges, marsh thistle, heath-grass, autumn hawkbit, heath wood-rush, purple moor-grass, lousewort and devil's-bit scabious. Interesting and uncommon strays from other communities include petty whin, dyer's greenweed, bristle club-rush and adder's-tongue. Examples of these damp, heathy *Molinia*-pastures are found in many parts of the upland but they, too, are disappearing rapidly because of hill-farm improvements.

9b) Grazed damp pasture: *Ajuga reptans, Carex echinata, C.panicea, C.nigra, C.ovalis, Cirsium palustre, Danthonia decumbens, Leontodon autumnalis, Luzula multiflora, Molinia caerulea, Pedicularis sylvatica, Succisa pratensis, Genista anglica, G.tinctoria, Isolepis setacea, Ophioglossum vulgatum*

At the foot of hills and in a few of the wider **valleys**, well below the marginal land, lie fields of what would once have been regarded as prime upland **meadow** or **pasture**. Their soils are relatively fertile and enjoy adequate drainage, but they have been managed by traditional methods using farmyard manure rather than artificial fertilisers. They have thus retained a rich and interesting flora whether or not an annual crop of **hay** is taken. A number of grasses including sweet vernal-grass, crested dog's-tail, meadow and red fescues, Yorkshire-fog, smaller timothy and yellow oat-grass are mixed with pale sedge, common mouse-ear, eyebright, oxeye daisy, burnet-saxifrage, yellow rattle, betony and red clover. Meadow saffron is still locally frequent on the Clee Hills Platform. The green-winged orchid is now much rarer than in 1940, when Lloyd classed it as one of the four common orchid species: "as abundant and as widely distributed in Shropshire as orchids can be expected to be." (The other three were common twayblade, early-purple orchid and common spotted-orchid).

9c) Hayfields and valley meadows: *Anthoxanthum odoratum, Cynosurus cristatus, Festuca pratensis, F.rubra, Holcus lanatus, Phleum pratense* ssp. *bertolonii, Trisetum flavescens, Carex pallescens, Cerastium fontanum, Euphrasia arctica, Leucanthemum vulgare, Pimpinella saxifraga, Rhinanthus minor, Stachys officinalis, Trifolium pratense, Colchicum autumnale, Orchis morio;*
Listera ovata, Orchis mascula, Dactylorhiza fuchsii

It is hardly surprising that the generally fertile and easily-managed soils of the **lowlands** are farmed today by methods which ensure the maximum productivity. The agricultural landscape is dominated by large arable fields and short leys. Much of the **grassland** is used for silage crops, and irrigation is not uncommon. Intensively-managed land of this kind is properly regarded as 'disturbed' in the ecological sense, and is dealt with in Chapter 8.

It is still possible to find the odd parcel of 'unimproved' grassland here and there, but fields which have remained unploughed and untreated with artificial fertilisers and herbicides are increasingly rare. They survive by accidents of geography or history, such as being inaccessible to machinery because of steep slopes, or enjoying common grazing rights, or serving other primary uses like churchyards and golf courses. There are still a few farms in the lowlands run on more or less traditional lines, and an outstandingly successful modern organic farming enterprise at Lea Hall, on Pim Hill. Species-rich pasture under skilful husbandry can provide a nutritious and varied diet for livestock.

The thought of early summer in the English Midland countryside will always conjure up, for many of us, a picture of rolling meadows yellow with buttercups. The regular undulations of mediaeval **ridge-and-furrow** are now ploughed out in many areas, and the buttercup – poisonous to stock when fresh but harmless in hay – is less common than it used to be. The subtle pattern described by Harper and Sagar (1953) in old pastures in Oxfordshire can still be seen locally, however: bulbous buttercup grew most abundantly on the well-drained crests of the ridges; creeping buttercup in the wet, nutrient-rich furrows; and meadow buttercup on the sloping sides of each ridge. This kind of variation within a single field illustrates the problems of sorting out and classifying the sub-types of the vegetation group called 'neutral grasslands' in the NCC's *A Nature Conservation Review*. Here we use an arbitrary division suggested by the buttercups and based on wetness.

10 Lowland 'neutral' grassland
10a) Ridge-and-furrow: *Rananculus bulbosus, R.repens, R.acris*

Relatively **dry lowland pasture** and **meadow** probably constitute the rarest sub-type. Perennial rye-grass, crested dog's-tail, cock's-foot and white clover are prominent among the grasses and other fodder plants, together with yarrow, daisy, common knapweed, pignut, ribwort plantain, self-heal, common sorrel, lesser stitchwort and thyme-leaved speedwell. A few old meadows, especially in the area south-east of Shrewsbury, still harbour colonies of meadow saxifrage.

10b) Dry pasture and meadow: *Lolium perenne, Cynosurus cristatus, Dactylis glomerata, Trifolium repens, Achillea millefolium, Bellis perennis, Centaurea nigra, Conopodium majus, Plantago lanceolata, Prunella vulgaris, Rumex acetosa, Stellaria graminea, Veronica serpyllifolia, Saxifraga granulata*

Despite great advances in land-drainage technology, there are areas where the remnants of old grassland persist on low-lying, poorly-drained soils, often as small fragments in **marshy** hollows or **swales**, in long, flat valleys, or beside slow streams and rivers. These **damp pastures,** suffering from impeded drainage and a fluctuating water table rather than frequent flooding, are among the richest and most colourful of our grasslands. Typical grasses include meadow foxtail and the conspicuous stiff tussocks of tufted hair-grass. Sneezewort replaces its relative, yarrow. The season opens with the yellow splendour of marsh-marigold and the palest lilac of cuckooflower. Ragged-Robin and the greater bird's-foot-trefoil follow, with many attractive small marsh plants. Large bitter-cress, bistort and the marsh-orchids are among the more local species of these communities.

10c) Damp pasture and marshy swales: *Alopecurus pratensis, Deschampsia cespitosa, Achillea ptarmica, Caltha palustris, Cardamine pratensis, Lychnis flos-cuculi, Lotus uliginosus, Cardamine amara, Polygonum bistorta, Dactylorhiza praetermissa*

On the **banks of ditches**, and at the **edges of fields** where the water level varies markedly with the seasons and grazing is restricted, the vegetation is taller and more luxuriant: reed canary-grass and sharp-flowered rush grow here with meadowsweet, water avens, meadow vetchling, marsh ragwort; and, much more rarely, great burnet, pepper-saxifrage and common meadow-rue: the last gives its name to Ruewood, an STNC nature reserve which is a particularly good example of this rapidly-vanishing type of vegetation.

10d) Ditch-banks and field-edges: *Phalaris arundinacea, Juncus acutiflorus, Filipendula ulmaria, Geum rivale, Lathyrus pratensis, Senecio aquaticus, Sanguisorba officinalis, Silaum silaus, Thalictrum flavum*

Although there are probably no true **water-meadows** which are still deliberately flooded to increase their fertility, considerable tracts of land in the region suffer intermittent flooding of a less controlled nature. At the confluence of the Severn and the Vyrnwy, near Melverley, and again at Leighton, near Buildwas, many hectares of meadow are subject to inundation when the rivers overtop their banks, leaving thick deposits of fresh Welsh silt as they recede. **Flood-swards** of prostrate pioneer grasses such as creeping bent, marsh foxtail and floating sweet-grass can locally dominate areas of this kind; hairy sedge, hard rush, creeping-Jenny and silverweed are also frequent. These communities of opportunist species are wet equivalents of ruderal vegetation types dealt with in Chapter 8.

10e) Water-meadows and flood-swards: *Agrostis stolonifera, Alopecurus geniculatus, Glyceria fluitans, Carex hirta, Juncus inflexus, Lysimachia nummularia, Potentilla anserina*

6.2 Computer analysis of the quadrat data

In the previous section (6.1), the main narrative theme was the development of the dry land surface from rock to deep soil, and the linked concept of successions in vegetation from crustose lichens to heath or grassland. Variations and digressions dealt with differences in base status, nutrient (PN) status and soil moisture content, which play leading roles in this second half.

The 'bare' rock communities on limestone (type 1 in the previous section) and on siliceous rocks (type 3) were not included in the computer analysis; nor was the unusual vegetation of Craig Breidden (type 5), nor the wetter lowland grasslands (type 10d and e) already covered in part by Chapter 5. In general, however, the heath and grassland communities recognised by the two approaches are quite closely comparable.

Eighty heath and grassland quadrats were analysed by computer methods. All these quadrats were used in the indicator species classification described later, but in the final stand and species ordinations shown in Fig. 6.4 seven of the more extreme stands were omitted. These ordinations were produced using the reciprocal averaging technique described at the beginning of Part Two. Each figure shows either the species or the stands plotted as a scatter of points against the first two axes of the ordination. As has already been explained, the geometrical relationships between the points in such diagrams can usually be interpreted in terms of the ecological affinities of the stands or species they represent.

In the species ordination many important species are named, while the stand ordination has been annotated in relation to the indicator species analysis of the stands which is discussed later. The compression of the stands at the left of axis 1 was originally even more pronounced than it appears in Fig 6.4.b. Considerable improvement was achieved by omitting the seven stands mentioned above. Five were of heather-dominated moorland from the Wrekin, the Long Mynd, and the Stiperstones. The other two stands were a rock exposure with sheep's-fescue and shepherd's cress from Craig Breidden, and a scree slope with parsley fern from Corndon Hill (3c in section 6.1). The omission of these stands has caused the disappearance of lady-fern, parsley fern, scaly male-fern, oak fern, navelwort, cowberry, and squirreltail fescue from the species ordination.

Calluna vulgaris

Festuca ovina, Teesdalia nudicaulis

Cryptogramma crispa

Athyrium filix-femina, Cryptogramma crispa, Dryopteris affinis, Gymnocarpium dryopteris, Umbilicus rupestris, Vaccinium vitis-idaea, Vulpia bromoides

In the scatter diagram which represents the species ordination (Fig. 6.4.a), there is a dense cluster of points to the left which includes such species as perennial rye-grass, self-heal, red fescue, betony, white clover, quaking-grass, glaucous sedge, hoary plantain, downy oat-grass, and adder's-tongue: species of old neutral and base-rich grassland (8b, 9c, and 10b in section 6.1).

Lolium perenne, Prunella vulgaris, Festuca rubra, Stachys officinalis, Trifolium repens, Briza media, Carex flacca, Plantago media, Avenula pubescens, Ophioglossum vulgatum

Above the dense cluster, species of damper base-rich grassland (9b in section 6.1) such as meadow fescue, blunt-flowered rush, bristle club-rush and marsh thistle start to appear. Higher still on axis 2 plants of even wetter situations appear: amphibious bistort, hard rush, sharp-flowered rush, ragged-Robin, marsh ragwort (10c and 10d in section 6.1).

Festuca pratensis, Juncus subnodulosus, Isolepis setacea, Cirsium palustre

Polygonum amphibium, Juncus inflexus, Juncus acutiflorus, Lychnis flos-cuculi, Senecio aquaticus

These distributions suggest that axis 2 represents a trend in increasing wetness. There are few species immediately below the main cluster, but the presence there of, first, salad burnet and lesser dandelion, and, lower still, of common rock-rose, hawkweed ox-tongue and hairy violet do suggest drier limestone habitats (8b and 8c of section 6.1).

Sanguisorba minor, Taraxacum section *Erythrosperma, Helianthemum nummularium, Picris hieracioides, Viola hirta*

The trend in axis 1 unaffected by axis 2 can be assessed by the species immediately to the right of the central cluster. Common bent, bitter-vetch and heath speedwell (though perhaps not dyer's greenweed) suggest somewhat poorer and more acid grassland than the species of the central cluster. Heath-grass is also in this area of the diagram; a compromise resulting from its occurrence in both damp heaths and limestone swards (see 9a and 9b of section 6.1). On the right of the diagram brown bent, heather, wavy hair-grass and then bilberry all tend to suggest that axis 1 represents a trend from base-rich soils of high pH on the left to base-poor soils of low pH on the right.

Agrostis capillaris, Lathyrus montanus, Veronica officinalis, Genista tinctoria

Danthonia decumbens

Agrostis canina

Calluna vulgaris, Deschampsia flexuosa, Vaccinium myrtillus

If axis 1 is associated with variation in soil base status and axis 2 with differences in soil moisture, the rising diagonal should represent a combined

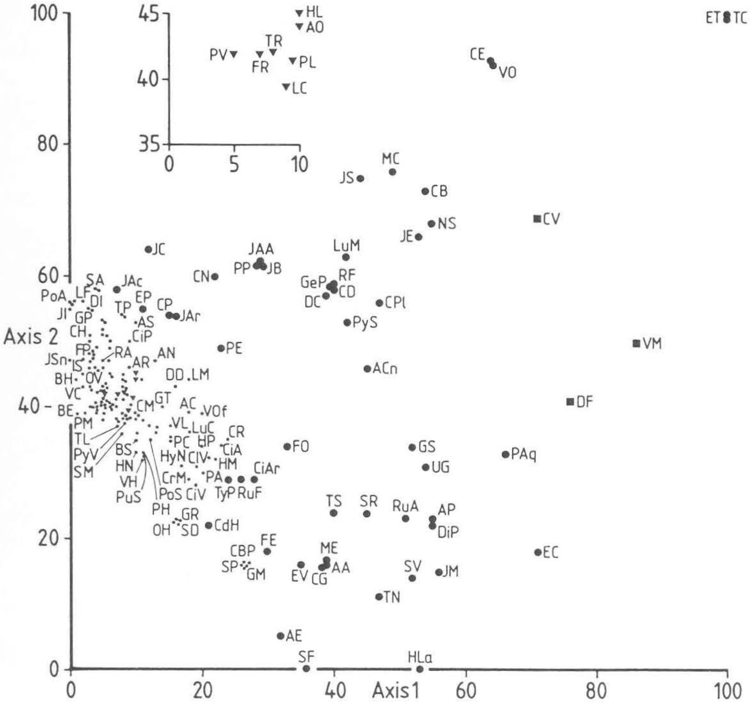


Figure 6.4a *Scatter diagram showing the distribution of 201 grassland and heath species on the first two axes of a reciprocal averaging ordination. The ordination was based on Domin values of the species.* (▼ = Group 0 indicator species; ■ = Group 1 indicator species.)

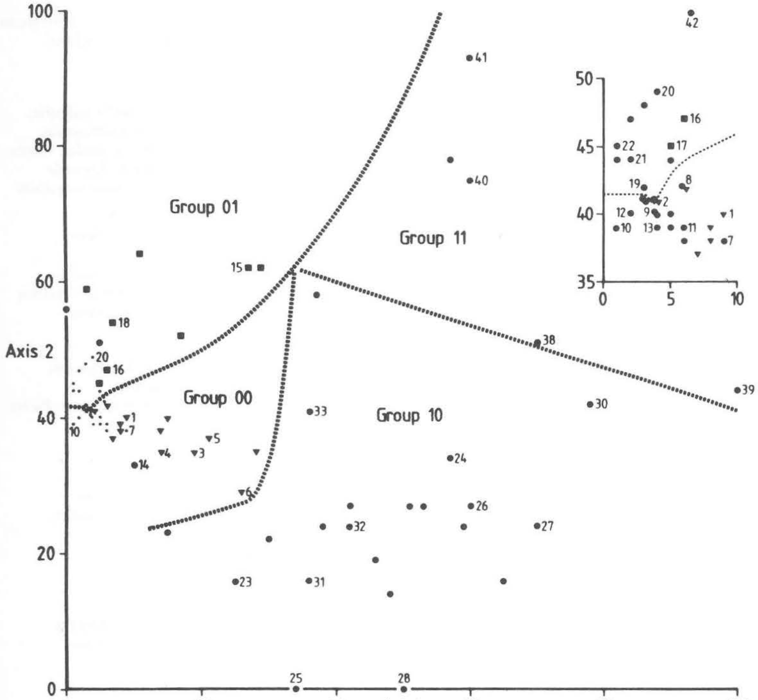


Figure 6.4b *Scatter diagram showing the distribution of 73 of the 80 grassland and heath stands on the first two axes of the reciprocal averaging ordination. The numbers of the stands correspond with those used in Table 6.1. The boundaries of Groups 00, 01, 10, and 11 formed by indicator analysis of the stands are indicated.* (■ = Group 010; ▼ = Group 000)

Key to Fig. 6.4a The number in brackets after each species indicates the number of stands, out of 73, in which it occurred.

EP	*Equisetum palustre (3)*
OV	*Ophioglossum vulgatum (3)*
PAq	*Pteridium aquilinum (7)*
ACn	*Agrostis vinealis (5)*
AC	*A. capillaris (54)*
AS	*A. stolonifera (10)*
AP	*Aira praecox (14)*
AR	*Ajuga reptans (14)*
AN	*Anemone nemorosa (4)*
AO	*Anthoxanthum odoratum (36)*
AA	*Aphanes arvensis (1)*
AE	*Arrhenatherum elatius (2)*
BS	*Brachypodium sylvaticum (3)*
BE	*Bromus erectus (2)*
BH	*B. hordeaceus (2)*
CV	*Calluna vulgaris (7)*
CR	*Campanula rotundifolia (10)*
CdH	*Cardamine hirsuta (2)*
CB	*Carex binervis (3)*
CD	*C. demissa (1)*
CE	*C. echinata (1)*
CH	*C. hirta (5)*
CN	*C. nigra (7)*
CP	*C. panicea (13)*
CPl	*C. pilulifera (4)*
ClV	*Carlina vulgaris (2)*
CBP	*Capsella bursa-pastoris (1)*
CG	*Cerastium glomeratum (1)*
CiA	*Cirsium acaule (1)*
CiAr	*C. arvense (4)*
CiP	*C. palustre (6)*
CiV	*C. vulgare (2)*
CM	*Conopodium majus (8)*
CrM	*Crataegus monogyna (4)*
DI	*Dactylorhiza incarnata (2)*
DD	*Danthonia decumbens (19)*
DC	*Deschampsia cespitosa (4)*
DF	*D. flexuosa (15)*
DiP	*Digitalis purpurea (3)*
EC	*Erica cinerea (2)*
ET	*E. tetralix (1)*
EV	*Erophila verna (2)*
FO	*Festuca ovina (37)*
FP	*F. pratensis (8)*
FR	*F. rubra (37)*
FE	*Fraxinus excelsior (2)*
GP	*Galium palustre (3)*
GS	*G. saxatile (15)*
GT	*Genista tinctoria (2)*
GeP	*Gentiana pneumonanthe (1)*
GM	*Geranium molle (1)*
GR	*G. robertianum (1)*
HN	*Helianthemum nummularium (3)*
HP	*Hieracium pilosella (20)*
HLa	*H. lasiophyllum (1)*
HL	*Holcus lanatus (32)*
HM	*H. mollis (3)*
HyN	*Hyacinthoides non-scripta (3)*
IS	*Isolepis setacea (2)*
JM	*Jasione montana (5)*
JAA	*Juncus acutiflorus × articulatus (1)*
JAr	*J. articulatus (4)*
JAc	*J. acutiflorus (6)*
JB	*J. bulbosus* agg. *(1)*
JC	*J. conglomeratus (1)*
JE	*J. effusus (4)*
JI	*J. inflexus (2)*
JS	*J. squarrosus (2)*
JSn	*J. subnodulosus (1)*
LM	*Lathyrus montanus (4)*
LC	*Lotus corniculatus (30)*
LuC	*Luzula campestris (33)*
LuM	*L. multiflora (5)*
LF	*Lychnis flos-cuculi (2)*
ME	*Moenchia erecta (1)*
MC	*Molinia caerulea (7)*
NS	*Nardus stricta (8)*
OA	*Oxalis acetosella (1)*
PP	*Pedicularis palustris (1)*
PH	*Picris hieracioides (1)*
PL	*Plantago lanceolata (33)*
PM	*P. media (2)*
PC	*Plantanthera chlorantha (1)*
PA	*Poa annua (4)*
PyS	*Polygala serpyllifolia (3)*
PyV	*P. vulgaris (5)*
PoA	*Polygonum amphibium (1)*
PE	*Potentilla erecta (25)*
Pos	*P. sterilis (8)*
PV	*Prunella vulgaris (20)*
PuS	*Prunus spinosa (1)*
RA	*Ranunculus acris (18)*
RF	*R. flammula (1)*
RuF	*Rubus fruticosus* agg. *(6)*
RuA	*Rumex acetosella (12)*
SM	*Sanguisorba minor (2)*
SF	*Sedum forsteranum (1)*
SA	*Senecio aquaticus (1)*
SV	*S. vulgaris (1)*
SD	*Silene dioica (1)*
SR	*Spergularia rubra (1)*
SP	*Stellaria pallida (1)*
TL	*Taraxacum* section *Erythrosperma (4)*
TN	*Teesdalia nudicaulis (3)*
TS	*Teucrium scorodonia (8)*
TyP	*Thymus praecox (6)*
TC	*Trichophorum cespitosum (1)*
TR	*Trifolium repens (29)*
TP	*Triglochin palustris (1)*
UG	*Ulex gallii (3)*
VM	*Vaccinium myrtillus (8)*
VO	*V. oxycoccos (1)*
VOf	*Veronica officinalis (5)*
VC	*Vicia cracca (2)*
VH	*Viola hirta (1)*
VL	*V. lutea (2)*

trend. The first species to appear away from the central cluster of the upward diagonal include carnation sedge, jointed rush, and tormentil, species of damper and poorer soils as in 9b of section 6.1. Common sedge, bulbous rush, and marsh lousewort suggest flushed, upland heathy grassland, and the trend continues with purple moor-grass, soft rush, mat-grass and heath rush (6b of section 6.1). Extreme species in this direction include cranberry, star sedge, and finally cross-leaved heath and deergrass, plants of acid *Sphagnum* bogs and wet moorland described in Chapter 5.

Carex panicea, Juncus articulatus, Potentilla erecta

Carex nigra, Juncus bulbosus agg., *Pedicularis palustris*

Molinia caerulea, Juncus effusus, Nardus stricta, Juncus squarrosus

Vaccinium oxycoccos, Carex echinata, Erica tetralix, Trichophorum cespitosum

On the simplified interpretation of the first two axes of the ordination given above, the area below and to the right of the dense cluster should represent both an increase in soil dryness and a decrease in base status relative to the main cluster of species. The first species to appear away from the main cluster include harebell, mouse-ear hawkweed, wild thyme and sheep's-fescue. These are plants equally at home on limestone and the rather base-poor rocks of dry hillsides (4a of section 6.1); even carline thistle fits into this category. Other species in this part of the diagram, such as wood-sorrel, refer to a single stand on a shaded scree on Earl's Hill. Points on a scatter diagram representing a very low number of occurrences are liable to give an inaccurate indication of the status of those species.

Campanula rotundifolia, Hieracium pilosella, Thymus praecox, Festuca ovina

Carlina vulgaris

Oxalis acetosella

In the lower central region of the diagram, species of dry acid heath and moorland appear: heath bedstraw, western gorse, sheep's sorrel, early hair-grass, and foxglove. Plants of this group occupy a broad band with respect to

Galium saxatile, Ulex gallii, Rumex acetosella, Aira praecox, Digitalis purpurea

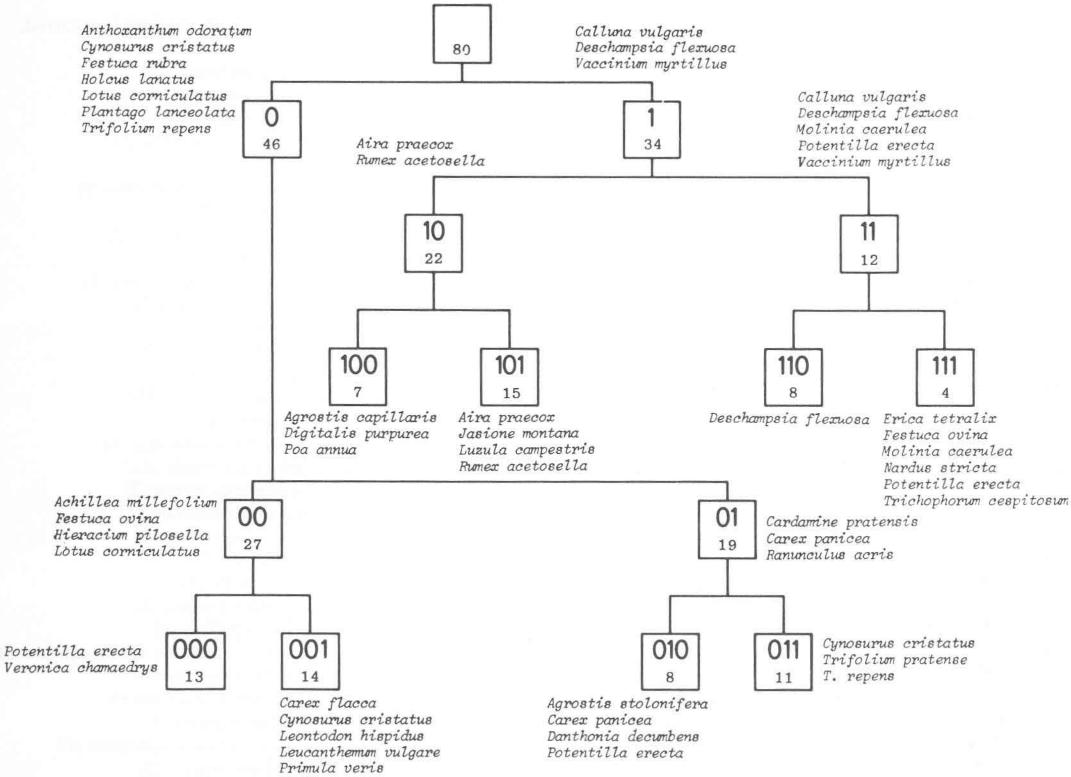


Figure 6.5 *Indicator species analysis of eighty 1m² grassland and heath stands from the Shropshire region. Group notations are shown in heavy type. The other figures in the squares give the numbers of quadrats. The most important division species are shown at each separation, each species being arranged on the side in which it tends to be present.*

axis 1. Rock stonecrop and false oat-grass occupy the 'dry' extreme (low values on axis 2) while sheep's-bit and bell heather occupy the 'acid' extreme (higher values on axis 1).

Sedum forsteranum, Arrhenatherum elatius

Jasione montana, Erica cinerea

Although the first two axes of the ordinations are not entirely simple, the pattern of the various plants plotted on the species ordination supports the view that soil moisture and base status are two main determinants controlling species distribution in the grass and heathland plots surveyed.

In Fig 6.4.b the **stands** are distributed in relation to the same environmental gradients as were represented for the **species** by axes 1 and 2 of Fig 6.4.a. The stand ordination has been annotated to show the main groups resulting from the **indicator species analysis**, which will be discussed simultaneously. Once again, the seven 'extreme' stands from Group 1 were not included in the ordination. The numbers 1-42 beside the dots show the 42 stands detailed in Table 6.1.

In the primary division of the quadrat data (see Fig. 6.5), Group 0 includes all the less acid and relatively species-rich grassland stands, whilst Group 1 stands are the generally more acid, relatively species-poor, heathy stands. In Fig. 6.4.a, three Group 1 indicators occur well to the right on axis 1, previously identified as being concerned with base status. The Group 1 indicators are all well known as calcifuge species, characteristic of dry or moderately damp situations low in plant nutrients and bases, often on podzolised soils. The Group 0 indicators are rather more diverse, but are associated with the species clustered to the left in Fig. 6.4.a; they are all commonly found in much less impoverished grassland types than are the Group 1 indicators.

Group 1 indicators
Calluna vulgaris, Deschampsia flexuosa, Vaccinium myrtillus

Group 0 indicators
Anthoxanthum odoratum, Cynosurus cristatus, Festuca rubra, Holcus lanatus, Lotus corniculatus, Plantago lanceolata, Trifolium repens

This analysis of the primary division is continued in Fig. 6.6 which provides information on soil pH values and numbers of species present in the groups of

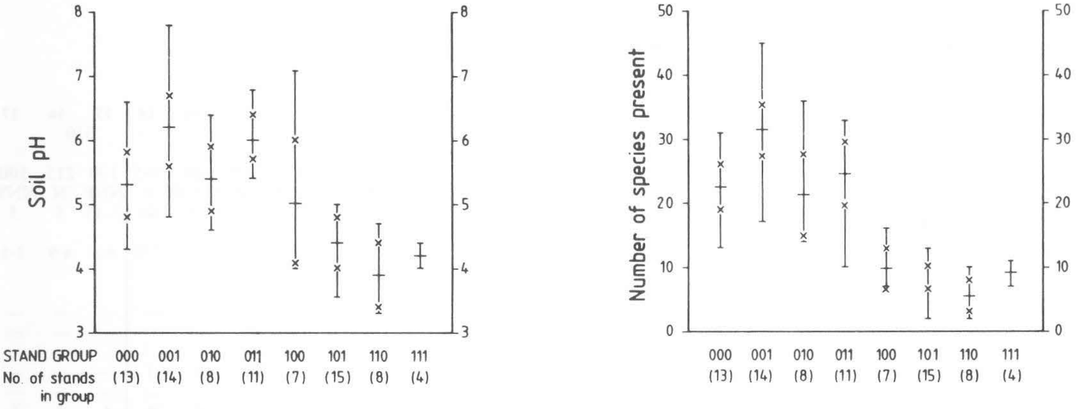


Figure 6.6 *Soil pH and species density (per 4m²) for the major polythetic divisive groups in eighty rock, heath, and grassland stands from the Shropshire region. 95% confidence limits are shown by the crosses. Soil pH was determined from samples taken at 0–5 cm depth.*

stands. The pH means for the Group 0 stands are all considerably higher than the pH means for the Group 1 stands.

The boundary between Group 0 and Group 1 is also marked on the stand ordination (Fig. 6.4.b). Axis 1 is the essential basis for the first division of the stands in the indicator species analysis and although there is slight overlap between Groups 0 and 1, the stands involved were shown as borderline cases by the computer analysis.

It can be seen from the stand ordination (Fig. 6.4.b) that the subdivision of Group 0 is closely related to axis 2, previously identified as concerned with soil moisture status. The Group 00 indicators, which are shown in the species ordination (Fig. 6.4.a), although they are ecologically quite diverse, are all plants of dry or moderately dry soils. The Group 01 indicators – cuckooflower, carnation sedge, and creeping buttercup – are all plants of damper habitats and all appear well above the 00 indicators on axis 1 in the species ordination. When the drier stands forming group 00 are subdivided, the soils of the Group 001 stands are generally less acid than those of Group 000. This is consistent with the position of the Group 000 stands on the stand ordination (Fig. 6.4.b). Tormentil is more abundant in poor, moderately acid grassland than germander speedwell, the other Group 000 indicator. The Group 001 indicators are all found particularly in base rich grassland of medium nutrient (PN) status of the type characterised as 8b in section 6.1. Group 000 conforms to 9a in 6.1.

Group 00 indicators
Achillea millefolium, Festuca ovina, Hieracium pilosella, Lotus corniculatus

Group 01 indicators
Cardamine pratensis, Carex panicea, Ranunculus repens

Group 000 indicators
Potentilla erecta, Veronica chamaedrys

Group 001 indicators
Carex flacca, Cynosurus cristatus, Leontodon hispidus, Leucanthemum vulgare, Primula veris

In the division of the damper stands of Group 01, the Group 010 indicators are ecologically rather unexacting; they can all be found in calcareous as well as acid grassland or heath. The Group 011 indicators, by contrast, are all characteristic of less damp soils rich in bases and plant nutrients. Oberdorfer (1979) classes both red and white clover as nitrogen indicators: despite the special ability of clovers (and other legumes) to fix atmospheric nitrogen, they cannot grow in inherently nitrogen-deficient soils.

Group 010 indicators
Agrostis stolonifera, Carex panicea, Danthonia decumbens, Potentilla erecta

Group 011 indicators
Cynosurus cristatus, Trifolium pratense, Trifolium repens

In the subdivision of the more heathy stands forming Group 1, the indicators for Group 10 are early hair-grass and sheep's sorrel. (See 4a to 4d in section 6.1). Both are pioneer plants of dry open habitats on thin, poor, acid soils, sheep's sorrel perhaps in a wider range of conditions than early hair-grass. The Group 11 indicators are the same as for Group 1 with the addition of purple moor-grass and tormentil. The Group 10/11 division appears to separate stands from shallow, dry soils in open situations often in the neighbourhood of rock outcrops from stands of more closed communities on deeper, damper, siliceous or peaty soils.

Group 10 indicators
Aira praecox, Rumex acetosella

Group 11 indicators
Calluna vulgaris, Vaccinium myrtillus, Deschampsia flexuosa, Molinia caerulea, Potentilla erecta

On the stand ordination the boundary between Group 10 and 11 is closely associated with axis 2, concerned with soil water status. Had the missing five

Table 6.1 *Stand-species matrix for 42 of the grassland and heath plots, each of which had an area of four square metres. Cover abundance values (recorded on the Domin scale) are given for the species present. Site locations and additional species are shown at the foot of the table.*

	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	POLYTHETIC DIVISIVE GROUP	000						001								010			
	Altitude (m)	213	229	355	168	300	300	180	180	150	221	180	200	100	195	300	215	100	105
	Aspect	NNW	W	NW	SSE	NW	SSW	WSW	—	ESE	SW	NW	SSE	WNW	S	NNE	N	NNW	—
	Slope (°)	15	2	7	20	25	20–30	5–20	0	8	32	25	20	35	40	5–15	5	5	0
	Soil pH	4·7	5·0	5·9	6·4	4·9	5·8	6·5	5·0	5·0	7·8	7·2	6·8	5·7	7·0	4·6	4·9	5·1	5·8
1	*Ophioglossum vulgatum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	*Pteridium aquilinum*	—	—	—	—	1	2	1	—	—	—	—	—	—	—	—	—	—	—
1	*Achillea millefolium*	2	2	—	3	2	2	2	2	—	2	2	4	4	3	—	—	—	—
2	*Agrostis vinealis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	*A. capillaris*	6	8	7	4	5	4	2	5	5	—	3	2	4	4	4	4	5	3
4	*A. stolonifera*	2	—	—	—	—	—	—	2	—	—	—	—	—	—	2	—	—	1
5	*Agrimonia eupatoria*	—	—	—	—	—	—	—	—	—	—	2	—	2	—	—	—	—	—
6	*Aira praecox*	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—
7	*Ajuga reptans*	4	2	—	—	—	—	—	—	—	—	—	—	—	—	—	4	1	4
8	*Alopecurus pratensis*	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	*Anemone nemorosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	5
10	*Anthoxanthum odoratum*	5	3	—	4	3	—	—	5	5	—	—	—	3	—	4	5	4	3
11	*Avenula pubescens*	—	3	—	—	—	—	—	—	—	—	—	5	—	2	—	—	—	—
12	*Bellis perennis*	2	—	—	—	—	—	—	—	2	1	2	—	5	4	—	—	—	—
13	*Briza media*	—	—	—	2	—	—	3	—	4	2	—	2	4	4	—	—	—	
14	*Bromus erectus*	—	—	—	—	—	—	—	—	—	7	—	7	—	—	—	—	—	—
15	*B. hordeaceus*	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—
16	*Calluna vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17	*Campanula rotundifolia*	3	—	4	—	—	3	—	—	—	—	—	—	1	—	—	—	—	—
18	*Cardamine hirsuta*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19	*C. pratensis*	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3
20	*Carex binervis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—
21	*C. caryophyllea*	2	—	—	3	—	2	1	3	2	2	4	—	—	—	—	1	—	—
22	*C. flacca*	—	—	—	—	—	—	4	—	4	—	3	1	5	3	2	—	1	5
23	*C. nigra*	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	1
24	*C. pallescens*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
25	*C. panicea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	4	—	3
26	*C. pilulifera*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27	*Carlina vulgaris*	—	—	—	—	—	2	—	—	—	—	—	—	—	2	—	—	—	—
28	*Centaurea nigra*	—	—	—	—	—	—	—	—	3	—	3	4	5	2	2	—	1	5
29	*Centaurium erythraea*	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—
30	*Cerastium fontanum*	—	—	1	—	—	—	—	—	1	1	1	—	—	—	—	—	—	3
31	*Cirsium palustre*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2
32	*C. vulgare*	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
33	*Conopodium majus*	—	4	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—
34	*Crataegus monogyna*.sdlg	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	1	—
35	*Cynosurus cristatus*	5	—	—	—	—	—	4	4	5	2	5	2	4	1	—	—	—	
36	*Dactylis glomerata*	—	3	—	—	—	—	—	—	1	3	3	4	4	1	—	—	—	1
37	*Danthonia decumbens*	—	—	—	2	—	3	3	—	5	—	—	—	2	3	4	4	—	—
38	*Daucus carota*	—	—	—	—	—	—	—	—	2	—	—	—	3	2	—	—	—	—
39	*Deschampsia cespitosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	1
40	*D. flexuosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
41	*Digitalis purpurea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42	*Erophila verna*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
43	*Festuca ovina*	6	—	7	8	8	5	5	5	—	—	6	—	—	6	3	—	—	—
44	*F. pratensis*	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—
45	*F. rubra*	4	6	3	—	—	—	—	4	5	1	3	7	4	2	—	4	7	6
46	*Filipendula ulmaria*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6
47	*Galium saxatile*	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
48	*G. verum*	—	—	—	—	—	2	—	—	—	2	—	3	—	—	—	—	—	—
49	*Heracleum sphondylium*	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	*Hieracium pilosella*	3	—	—	1	1	4	3	—	1	1	3	—	3	3	—	—	—	—

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		
	011				100						101						110					111			
180	350	200	210	355	450	230	285	305	259	345	305	265	325	180	385	520	490	425	367	381	440	382	235		
NE	SE	SW	—	—	NNE	E	NNW	SSW	SE	SE	N	W	SSE	SSE	ESE	SSE	W	S	ENE	NE	ESE	E	—		
3	3	2	0	0	20	30	20–30	45	35	0–90	20–75	45	15–70	5	10	9	40	30	5–20	10	2	10	0		
5·5	6·4	6·6	6·1	5·4	4·0	5·3	4·2	4·3	4·8	4·8	4·1	5·0	3·8	5·0	3·3	3·5	3·7	4·7	4·2	3·9	4·3	4·4	4·0		
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	2	—	—	—	3	3	—	—	—	—	2
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	2
5	6	6	6	5	3	2	3	—	—	—	3	—	—	5	—	—	—	1	4	—	—	—	—	—	3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
—	—	—	—	—	6	—	1	2	3	1	3	3	—	—	—	—	—	—	—	—	—	—	—	—	6
—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7
—	—	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8
—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
6	5	4	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	10
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14
—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15
—	—	—	—	—	—	—	—	1	—	—	4	—	—	—	7	8	4	—	3	—	8	2	2	—	16
—	—	—	—	—	—	—	—	—	—	—	—	1	—	3	—	—	—	—	—	—	—	—	—	—	17
—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18
—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	20
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	2	—	—	23
—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24
—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	25
—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	1	—	—	—	—	—	26
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	27
—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29
1	2	2	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31
—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33
—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34
6	3	3	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35
—	—	5	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	36
—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	37
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	39
—	—	—	—	—	—	—	4	4	—	—	5	—	—	—	5	4	5	3	4	4	—	—	4	—	40
—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	41
—	—	—	—	1	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	42
—	—	—	—	4	2	4	—	4	4	5	2	8	5	8	—	—	—	3	—	—	2	3	—	—	43
—	2	1	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44
4	5	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45
—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46
—	—	—	—	—	2	—	1	2	—	—	1	—	—	5	—	—	—	1	5	2	—	—	—	—	47
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48
—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49
—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	50

51	*Holcus lanatus*	2	3	—	—	—	—	—	4	4	—	3	2	4	—	4	4	5	4
52	*H. mollis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
53	*Hyacinthoides non-scripta*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54	*Hypochoeris radicata*	—	—	—	—	—	—	5	4	4	—	—	—	4	—	—	—	—	—
55	*Jasione montana*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
56	*Juncus acutiflorus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2
57	*J. articulatus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
58	*J. effusus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
59	*J. squarrosus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	*Lathyrus montanus*	—	—	—	—	3	—	—	—	—	—	—	—	—	—	2	—	—	—
61	*L. pratensis*	—	—	—	—	—	—	—	—	1	—	1	4	—	—	—	—	—	4
62	*Leontodon autumnalis*	2	—	—	2	—	—	—	2	2	—	—	—	—	—	—	—	—	1
63	*L. hispidus*	—	—	—	—	—	—	—	3	4	—	2	2	2	2	—	—	—	1
64	*L. taraxacoides*	—	—	—	—	—	—	—	—	2	—	—	2	—	—	—	—	—	—
65	*Leucanthemum vulgare*	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	—	—	—
66	*Linum catharticum*	—	—	—	1	—	1	—	—	1	3	—	—	2	1	—	—	—	—
67	*Listera ovata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
68	*Lolium perenne*	—	—	—	—	—	—	—	—	—	—	4	3	2	—	—	—	—	—
69	*Lotus corniculatus*	3	2	—	3	2	4	4	4	3	3	3	3	4	2	—	3	—	—
70	*L. uliginosus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
71	*Luzula campestris*	2	3	4	3	2	3	—	—	2	—	1	—	3	2	—	—	2	2
72	*L. multiflora*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
73	*Molinia caerulea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	4
74	*Nardus stricta*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—
75	*Orchis morio*	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—
76	*Pedicularis sylvatica*	2	—	—	—	—	—	4	3	2	—	—	—	—	—	—	4	—	—
77	*Pimpinella saxifraga*	—	—	—	2	—	—	1	—	2	—	—	2	2	—	—	—	—	—
78	*Plantago lanceolata*	3	3	3	3	3	2	3	4	3	3	4	—	—	3	—	3	3	5
79	*P. media*	—	—	—	—	—	—	—	—	—	4	2	—	—	—	—	—	—	—
80	*Poa annua*	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
81	*P. pratensis*	—	4	2	—	—	—	—	—	—	1	—	4	—	2	—	—	—	—
82	*P. trivialis*	—	—	—	—	—	—	—	—	—	—	—	1	2	—	—	—	3	—
83	*Polygala vulgaris*	—	—	—	2	—	—	3	—	3	—	—	—	1	—	—	—	—	—
84	*Potentilla erecta*	3	—	—	2	4	2	2	1	—	—	—	—	—	—	4	3	1	—
85	*P. sterilis*	—	—	—	—	—	1	—	—	—	—	—	—	3	—	—	—	—	—
86	*Primula veris*	—	3	—	—	—	—	—	—	3	—	1	3	3	2	—	—	—	3
87	*Prunella vulgaris*	4	—	—	—	—	—	1	2	3	2	—	—	3	—	—	4	—	—
88	*Ranunculus acris*	3	—	—	—	—	—	2	—	1	—	—	—	—	—	—	4	3	3
89	*R. bulbosus*	1	3	2	4	—	—	—	4	3	—	1	5	3	3	—	—	—	—
90	*R. ficaria*	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
91	*R. repens*	—	—	—	—	—	—	—	4	—	1	—	—	—	—	—	2	—	3
92	*Rhinanthus minor*	—	2	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
93	*Rubus fruticosus* agg.	—	—	—	1	—	—	—	—	—	—	—	—	—	2	—	—	—	—
94	*Rumex acetosa*	2	3	2	2	—	—	—	—	—	—	—	—	—	—	—	—	1	4
95	*R. acetosella* agg.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
96	*Sanguisorba minor*	—	—	—	—	—	—	—	—	—	—	4	—	—	3	—	—	—	—
97	*Senecio jacobaea*	—	—	—	—	—	—	—	—	1	1	—	—	2	1	—	—	—	—
98	*Stachys officinalis*	—	—	—	—	—	—	2	—	5	—	—	—	—	—	—	—	—	—
99	*Succisa pratensis*	—	1	—	—	—	—	—	4	1	—	—	—	3	—	2	5	—	—
100	*Taraxacum* sect. *Erythrosperma*	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—
101	*Taraxacum* spp.	2	—	—	—	—	—	—	—	2	—	2	1	3	2	—	1	—	—
102	*Teesdalia nudicaulis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
103	*Teucrium scorodonia*	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
104	*Thymus praecox*	—	—	—	—	—	5	—	—	—	—	—	—	—	5	—	—	—	—
105	*Trifolium dubium*	—	—	1	1	—	—	1	—	—	2	—	—	—	—	—	—	—	—
106	*T. pratense*	2	2	—	—	—	—	2	—	3	1	2	—	—	—	—	2	—	—
107	*T. repens*	3	3	6	1	—	—	4	—	3	—	3	3	2	—	—	2	—	—
108	*Trisetum flavescens*	—	2	—	—	—	—	—	—	—	—	2	—	1	1	—	—	—	—
109	*Ulex gallii*	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
110	*Vaccinium myrtillus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
111	*V. vitis-idaea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
112	*Veronica chamaedrys*	2	3	2	2	—	—	—	—	—	—	—	2	—	—	—	—	—	—
113	*Viola riviniana*	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—
	Species per stand	31	25	15	27	13	21	26	22	39	27	29	28	37	39	21	22	19	36
	Stand No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

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3	3	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	106
2	3	3	3	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	107
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29	32	28	18	16	7	8	7	12	10	7	9	13	2	11	4	5	5	10	10	4	11	10	7		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		

GROUP 000

1. North-facing field bank grazed by cattle in summer, Llanhowell, near Clun. National Grid Reference SO 3479. Clay loam over Upper Silurian. (*Veronica serpyllifolia* 1).
2. *Colchicum* meadow, Clee Hill, near Ludlow. SO 5774. Clay loam over Coal Measures.
3. Field grazed by cattle, Shelve, Stiperstones. SO 3399. Light friable brown earth (to peaty clay loam) over Ordovician siltstones. (*Viola lutea* 4).
4.. Scrub-invaded and rather disturbed pasture margin, Crickheath Hill, near Pant. SJ 2723. Light loam over Carboniferous Limestone. (*Hieracium* sp. 3, *Platanthera chlorantha* 1, *Ulex europaeus* seedling 1).
5. Lightly grazed steep pasture invaded by scrub, Westcott Hill, near Pontesbury. SJ 403009. Sandy clay loam over Longmyndian sediments (Pre-Cambrian). (*Fraxinus excelsior* seedling 1).
6. Sloping pasture grazed by sheep, Titterstone Clee, near Ludlow. (See also stand 27). SO 604756. Loam (*Cirsium acaule* 4).

GROUP 001

7. Cattle pasture, Stoke St Milborough, Brown Clee. SO 5180. Medium clay on Old Red Sandstone (Devonian). (*Carex pulicaris* 3, *Dactylorhiza fuchsii* 2).
8. Drier area of damp pasture, Oreton, Titterstone Clee. SO 652803. (See also stand 19).
9. Steep bank grazed by cattle, Hope Valley, near Minsterley. SJ 3602. Clay with a small loam content. (*Potentilla anglica* 1).
10. Cattle-grazed grass on low mounds of limestone spoil, old quarry, Wenlock Edge. SO 608997. Silt clay over Wenlock Limestone (Silurian). (*Leucanthemum vulgare* 2).
11. Heavily grazed and poached pasture, Benthall, near Broseley. SJ 6502. Clay with some loam over Wenlock Limestone (reef facies).
12. Pasture grazed by cattle in summer, near Llanyblodwel. SJ 2525. Clay loam on Boulder Clay over Carboniferous Limestone. (*Medicago lupulina* 1, *Vicia cracca* 3).
13. Steep cattle pasture near Whitehaven Quarry, Llynclys. SJ 2524. Clay loam over Caradocian (Ordovician) sediments. (*Genista tinctoria* 1, *Knautia arvensis* 1).
14. Steep cattle pasture near Whitehaven Quarry, Llynclys. SJ 2624. Shallow, friable loam over blocks of Carboniferous Limestone. (*Brachypodium sylvaticum* 2, *Cirsium arvense* 1, *Euphrasia nemorosa* 2, *Helianthemum nummularium* 4, *Hieracium* sp. 1, *Picris hieracioides* 3, *Prunus spinosa* 2).

GROUP 010

15. Wet pasture below Shelve Pool dam, Stiperstones. SO 337980. Medium clay over Ordovician shales. (*Juncus acutiflorus* × *articulatus* 2, *J. kochii* 2, *Pedicularis palustris* 2).
16. Flushed slope, Llanhowell, near Clun. SO 3479. Brownish-grey clay over Upper Silurian sediments. (*Dactylorhiza fuchsii* × *maculata* 4).
17. Damp hay meadow, Albrighton. SJ 824037. Clay loam over lower Keuper (Triassic) Sandstone. (*Carex hirta* 1, *Sanguisorba officinalis* 4).
18. Fen area in field near Llanyblodwel. SJ 2623. Black peaty clay on Boulder Clay over Caradocian (Ordovician) sediments. (*Dactylorhiza praetermissa* 3, *Equisetum palustre* 2, *Lychnis flos-cuculi* 1, *Triglochin palustris* 4).

GROUP 011

19. Wetter part of damp pasture (see also stand 8). Oreton, Titterstone Clee. SO 654802. Silty clay loam.
20. Stand in wetter area of hay field at Stapeley Hill, near Priest Weston. The field had been regularly manured and had received a little artificial fertilizer. SO 3199. (*Juncus bufonius* 1, *Myosotis discolor* 1).
21. Grassland both grazed and cut for hay, Dorrington, near Ditton Priors. SO 6090. (*Tragopogon pratensis* 2).
22. Semi-improved hay meadow, Lower Norncott, Brown Clee. SO 566867. Medium clay over Old Red Sandstone.

GROUP 100

23. Slight depression, much trodden and dunged by sheep, close to the summit of Breidden Hill, Powys. SJ 295144. Humose sandy soil with much stone over Ordovician dolerite. (*Capsella bursa-pastoris* 4, *Geranium molle* 3, *Montia fontana* subsp. *chondrosperma* 3, *Stellaria pallida* 1, *Veronica arvensis* 1).
24. Dry heathy grassland grazed by sheep above Newpool Valley, Long Mynd. SO 432944. Very shallow acid brown soil above Longmyndian (Pre-Cambrian) shales.
25. Coarse scree being colonised by scrub, Earl's Hill, Pontesbury. SJ 411049. Very humose soil with much plant litter over Ordovician dolerite. (*Arrhenatherum elatius* 4, *Fraxinus excelsior* 1, *Sedum forsteranum* 4).
26. North-facing scree, Breidden Hill, Powys. SJ 297146. Thin humose loam between rocks on Ordovician dolerite.

GROUP 101

27. Steep pasture grazed by sheep, Titterstone Clee. (See also stand 6). SO 604756. Humose sandy loam. (*Erica cinerea* 2).
28. Consolidated scree, Earl's Hill, near Pontesbury. SJ 409047. Slightly humose stony loam on Ordovician dolerite. (*Hieracium lasiophyllum* 5, *H. acuminatum* 3).
29. Rock exposure near summit of Breidden Hill, Powys. SJ 295144. Stony humose loam over Ordovician dolerite. (*Sedum anglicum* 3, *Umbilicus rupestris* 3, *Vulpia bromoides* 3).
30. North-facing heathy slope grazed by sheep, Carding Mill Valley, Long Mynd. SO 439949. Very humose sandy soil over Longmyndian (Pre-Cambrian) sediments.
31. Steep pasture grazed by cattle on shallow soil with exposed rock, Long Mountain. SJ 266088. (*Aphanes arvensis* 2, *Cerastium glomeratum* 2, *Moenchia erecta* 4, *Myosotis discolor* 1).
32. South-facing rock exposure, Carding Mill Valley, Long Mynd. SO 439948. Slightly humose sandy loam with much stone on hard silty shale of Longmyndian (Pre-Cambrian) age. (*Spergularia rubra* 1).
33. Damp, steep hill grazing, Squilver, Stiperstones. SO 3796. Peaty clay loam. (*Veronica officinalis* 2).

GROUP 110

34. Trampled grassland near summit of Wrekin, near Wellington. SJ 630082. Humose sandy soil with stones on Uriconian (Pre-Cambrian) rhyolite.
35. Upland heath on scree from the Stiperstones Quartzite (Ordovician). SO 367985. A rudimentary soil, mainly of humus and partially comminuted plant litter, occurs between the stones and boulders. (*Empetrum nigrum* 1).
36. Rock exposure, Stiperstones ridge. SO 366982. Organic soil in fissures in the Stiperstones Quartzite.
37. Coarse scree, Corndon Hill, Powys. SO 305960. Rudimentary organic soil between stones of Ordovician quartz-dolerite. (*Athyrium filix-femina* 3, *Cryptogramma crispa* 2, *Dryopteris affinis* 4, *Gymnocarpium dryopteris* 2).
38. Dry heathy grassland, lightly grazed by sheep, Corndon Hill, Powys. SO 311973. Organic soil over sand above Ordovician quartz-dolerite intrusion.
39. Dry moorland on Long Mynd plateau. SO 438945. Humose sandy soil over Longmyndian (Pre-Cambrian) rock.

GROUP 111

40. Damp pasture grazed by sheep and cattle, Stiperstones Ridge. SO 369979. Humose sandy soil over Stiperstones Quartzite.
41. Wet grassland, lightly grazed by sheep, on edge of valley bog, Montgomeryshire. SJ 23. Very humose soil over Caradocian (Ordovician) sandstones. (*Carex echinata* 2, *Vaccinium oxycoccos* 4).
42. Damp heathland, Catherton Common, Titterstone Clee. SO 642791. Very humose sandy loam on Millstone Grit. (*Erica tetralix* 3, *Trichophorum cespitosum* 4).

Group 11 stands been included they would have reinforced the impression that the tendency for low base status is stronger in Group 11 than Group 10. There is some support for this contention in Fig 6.6, where mean soil pH is higher in the two 10 groups than in the two 11 groups.

When Group 10 is subdivided Group 100 has common bent, annual meadow grass, and foxglove as indicators. Both annual meadow grass and foxglove tend to appear on disturbed ground, foxglove particularly in felled woods, and all three species favour somewhat nutrient-enriched soils. (See 4a and 4c in section 6.1). Group 100 stands are all from open and mostly overgrazed and heavily dunged rocky uplands. Group 101 stands are also from open habitats, but the indicator species are associated with nutrient-poor conditions (4a, 4b, 4c in section 6.1). The open vegetation at these sites appears to be a consequence of the shallowness and drought liability of the soils, rather than disturbance and overgrazing. Many Group 101 stands are on south-facing slopes and therefore vulnerable to drought.

Group 100 indicators
Agrostis capillaris, Poa annua, Digitalis purpurea

Group 101 indicators
Aira praecox, Jasione montana, Luzula campestris, Rumex acetosella

When Group 11 (less open vegetation on deeper soils) is subdivided, the single indicator for Group 110 is wavy hair-grass, a calcifuge plant of dry, peaty or stony soils. Most of the Group 111 indicators suggest damper soils (6d in section 6.1). Both cross-leaved heath and deergrass only occur in single stands in the analysis but they have been included as indicators since they clearly fit this trend.

Group 110 indicator
Deschampsia flexuosa

Group 111 indicators
Erica tetralix, Festuca ovina, Molinia caerulea, Nardus stricta, Potentilla erecta, Trichophorum cespitosum

42 of the 80 stands analysed for the present study are shown in the stand-species matrix of Table 6.1. Group 000, identified above as consisting of stands from dry, moderately acid, grasslands, conforms to the drier hill grassland (9a and 9c) of section 6.1. Stands 1-3 represent 8 stands in the original analysis which constituted Group 0000. These were from pastures, sometimes cut for hay, on clay-loam or loam soils, with relatively gentle gradients. Many of the stands approach the 'calcareous clay pastures' of Ratcliffe (1977), but some have a more heathy tendency with tormentil and heath bedstraw present.

Group 0000 indicators
Campanula rotundifolia, Dactylis glomerata, Festuca rubra, Trifolium pratense, Veronica chamaedrys

Potentilla erecta, Galium saxatile

Group 0001 constitutes the remaining 5 stands of Group 000. The stands cover a somewhat similar range of situations to Group 0000, but are mostly on steep slopes; both the indicators – fairy flax and mouse-ear hawkweed – suggest a less dense sward and a drier soil than for Group 000.

Group 0001 indicators
Linum catharticum, Hieracium pilosella

Group 001, for which the indicator species (see Fig. 6.5) suggest base-rich or even calcareous conditions, is made up of 14 stands of which 8 are shown in Table 6.1. Most are on limestone soils or on drift over limestone and conform to the limestone grasslands (8b and 8c, of section 6.1). Group 001 is divided into Group 0010, 5 stands which are represented by stands 7–9 in Table 6.1, and Group 0011 with 9 stands represented by stands 10–14. The indicators for Group 0010 – cat's-ear, lousewort, and heath-grass – suggest rather less dry conditions than the Group 0011 indicators common knapweed, perennial rye-grass, yellow oat-grass and mouse-ear hawkweed. The stands of Group 0010 and Group 0001 form a continuum between the hill grasslands of Group 0000 and the limestone grasslands of Group 0011. All the Group 0011 stands are from the Silurian or Carboniferous limestone areas of the Shropshire region.

Group 0010 indicators
Hypochoeris radicata, Pedicularis sylvatica, Danthonia decumbens

Group 0011 indicators
Lolium perenne, Trisetum flavescens, Centaurea nigra, Hieracium pilosella

The 19 damper grassland stands forming Group 01 are represented in Table 6.1 by stands 15–22. Together they give an impression of the range of damper grassland types described in section 6.1. Group 010, stands on wetter and less base-rich soils, is subdivided into Group 0100, for which the indicators included heath-grass and heath wood-rush, and Group 0101, for which the indicators included cuckooflower, sheep's sorrel, and ribwort plantain. Group 0100 seems to be a distinctly more base-poor group of marshy grassland stands conforming largely to the grazed damp acid hill pastures (9b) of section 6.1.

Group 0100 indicators
Danthonia decumbens, Luzula multiflora, Succisa pratensis, Trifolium repens

Group 0101 indicators
Cardamine pratensis, Rumex acetosella, Plantago lanceolata

Group 011 includes the 11 marshy grassland stands on less wet and generally richer soils than those of Group 010 and gives examples from the hayfields and valley meadows (9c) and the neutral grasslands (10b) of section 6.1.

Group 1 is made up of 34 stands, of which 20 are seen in Table 6.1. Group 10, open communities mostly on dry shallow soils, includes 22 stands, of which 11 are shown. They conform largely to the 'steep sunny slopes' (4) of section 6.1. The Group 100 stands have already been identified as overgrazed or disturbed stands, mostly rendered relatively nutrient-rich by dunging. Of these seven stands, four form Group 1000 with sheep's-fescue, mat-grass, and annual

Group 1000 indicators
Festuca ovina, Nardus stricta, Poa annua

meadow-grass as indicators. They are all from sheep-grazed acid grasslands and colonised screes on non-calcareous rocks.

The three Group 1001 stands represent a wide range of rock screes, from a Carboniferous Limestone scree (not included in Table 6.1) to dolerite screes on Craig Breidden and Earl's Hill. These have false oat-grass, common dog-violet, bramble, and wood sage as indicators, mostly suggesting woodland affinities; all are being invaded by scrub. Drought liability and physical instability seem more important than grazing in keeping these sites open, and the high nutrient status suggested by the Group 100 indicators is probably here due to the deposition of tree leaf litter rather than to dunging. Other Carboniferous Limestone rock exposures might well have been included in this group, but since most are seen in quarries in the Shropshire Region they have been included in the analysis of disturbed and ruderal sites in Chapter 8.

Group 1001 indicators
Arrhenatherum elatius, Viola riviniana, Rubus fruticosus agg., *Teucrium scorodonia*

Group 101 is made up of all the other examples of open vegetation on dry shallow soils. The Group 101 stands are probably all nutrient poor relative to Group 100, with a uniformly low pH, and come from a variety of habitats marginal to heathland. Nine of these stands form Group 1010, with sheep's sorrel, early hair-grass, and common bent as indicators. They are examples of dry acid grassland, rock exposures, and colonised screes from a wide variety of situations all at fairly high altitudes. Four examples are shown in Table 6.1.

Group 1010 indicators
Rumex acetosella, Aira praecox, Agrostis capillaris

A further six stands constitute Group 1011, with mouse-ear hawkweed, harebell, ribwort plantain and wild thyme as indicators. These are mostly steep, southern or western exposures with shallow soils, and are otherwise similar to Group 1010. The indicators suggest slightly less base-poor conditions than for Group 1010.

Group 1011 indicators
Hieracium pilosella, Campanula rotundifolia, Plantago lanceolata, Thymus praecox

The remaining nine stands in Table 6.1 represent the 12 stands which make up Group 11, identified previously as heaths and heathy grassland, conforming to the upland heaths and moors (6 of section 6.1). Group 110, the stands on drier soils, are all at relatively high altitude. Taken together the Group 110 stands give an impression of the approach to the dry upland heaths of Wales seen in the Shropshire Region. Stand 37, from the southern scree slopes of Corndon Hill, is highly reminiscent of the screes of the Welsh mountains and it is interesting to note fainter echoes on Titterstone Clee, where parsley fern, scaly male-fern, and oak fern may also be found.

Cryptogramma crispa, Dryopteris affinis, Gymnocarpium dryopteris

Group 111 includes four stands, and hence further subdivision will not be attempted. Other wet heathlands have been described in Chapter 5, and Group 111 clearly grades into the moorland stands and the wet heathlands and upland valley bogs of the wetlands analysis (Chapter 5).

7 Woodland, hedge and scrub

Old sessile oak coppice and lichen-covered rocks in Oaks Wood

7.1 Introduction

WOODLAND which has been in existence continuously since the re-establishment of forest cover after the last glaciation is known as **primary woodland.** Continuous existence does not mean that trees have never been cut down, nor even that clear-felling has never occurred: it does, however, imply that regeneration has taken place immediately following felling, and that there has been no break in the use of the site for woodland. **Secondary woodland,** therefore, is woodland which has developed, or been planted, on a site which has had some other use, usually as agricultural land. Because of the difficulties involved in deciding whether a wood is truly primary, it is more useful to make a distinction between **ancient woodland** (pre-1600) and **recent woodland.**

In Neolithic times woodland cover was so dense as to make movement difficult on the plains, valleys and lower hill slopes. Even then, the crests of the higher Shropshire ridges were relatively bare of trees, a circumstance which led to the development of the long-distance ridge tracks (Chitty 1956). Shropshire is no longer a well-wooded county, although many areas are well endowed with trees (mostly in hedgerows) to the extent that parts of the north Shropshire plain, for example, give the impression of almost continuous tree cover when seen from a distance. Rather more than 6% of the county is occupied by woodland, compared with a national average of 8 or 9%. However, Shropshire compares favourably with many Midland and eastern counties, some of which have woodland areas as low as 2 or 3%. Woodland is distinctly unevenly distributed in Shropshire. In general, the distribution of woodland is correlated with the geological and topographic division between the ancient rocks and hilly country of the south and west, and the more recent rocks of the north Shropshire plain. This distribution can be explained by the clearance of the forest from the areas which were most suitable for agriculture. Thus, although few woods are present above 360m, ancient woods are frequently situated on hillsides and hilltops, the areas which are least suitable for agriculture. A high proportion of the most interesting woods is steeply sloping. South Shropshire is, therefore, better endowed with woodland than the north of the county.

In the past many woodlands were retained as hunting forests (see 3.5) or managed as coppice, though in Shropshire the common practice of employing coppice hazel with standard pedunculate oaks was not widespread. Stately isolated trees with rich epiphytic lichen floras occur in such places as Loton Park, Alberbury, while Ragleth Wood is a striking example of wood pasture. Light grazing delays canopy closure and helps understorey species to survive, as in Novers Wood to the south of Clee Hill. This is one of five communities discussed by Cameron (1980) in studies of species composition and succession in some Shropshire woods.

Coppicing formed the basis of the charcoal industry as well as yielding tan bark and wood. Its influence on the vegetation of the Wyre Forest was described by Salisbury (1925), when the system was still extensively employed. Most of the woods, in which sessile oak (*Quercus petraea*) was then the most important tree, were coppiced on a compartment system at approximately 16–18 year intervals. Each area was clear cut except for the few seeding trees. In some places there were two ages of coppice, with the general matrix being on a shorter rotation than the more sparsely scattered oaks which were cut at longer intervals. The larger coppice stems were used for pit props, while some of the branches were rent and used to make oak baskets. An interesting succession developed on the old hearths used for the production of charcoal from the smaller cordwood (2.5–10cm in diameter). Recent hearths were blackened areas devoid of vegetation, but these were soon colonised, being especially suitable for the development of seedling trees so that old hearths were frequently covered by a thicket of shrubs and trees. Hearth sites were favourable to plant growth in several respects, being initially devoid of competition and having a surface soil enriched with carbonates, nitrates and phosphates, as well as a pH above that of the surrounding area.

The bryophytes *Marchantia polymorpha, Funaria hygrometrica* and *Ceratodon purpureus* often occurred in great profusion during the early colonisation of a hearth, as they do today on the nutrient-rich sites of minor fires left after coppicing. Even in older phases when many woodland herbs, shrubs and trees had invaded, the more calcicole character of the hearth vegetation remained evident and species such as wood sanicle (*Sanicula europaea*) were often present, though absent from the surrounding vegetation.

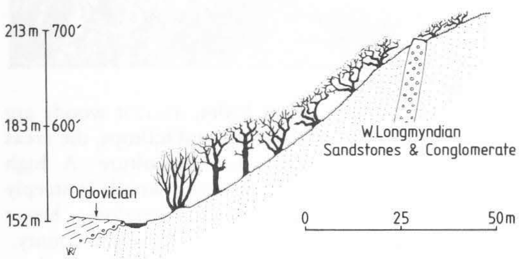

Figure 7.1 *W–E section through Oaks Wood and Habberley Brook, SJ 413048–414048 (c300m N of Fig. 6.2), showing geology and formerly coppiced* Quercus petraea *woodland with* Tilia platyphyllos *at the foot of the slope.*

7.2 Status of some Shropshire trees and shrubs

Shropshire is a transitional area for oaks, whose characteristics are well described by Morris and Perring (1974). Here we have not only pedunculate oak and sessile oak but also trees of an intermediate nature, supposedly of hybrid origin. Nevertheless, the pedunculate oak (*Quercus robur*) is commoner as a hedgerow tree and in lowland oakwoods, whereas the sessile oak (*Q. petraea*) is more frequent in the uplands, notably in the coppiced oakwoods. The oak woodland on the Ercall Hill is known to be of great antiquity and is very diverse genetically. Many Shropshire place names involve the oak (or *ac* in its Anglo-Saxon form), e.g. Oakengates, Acton Burnell, while in some cases the reference is oblique, e.g. Tantree Bank, probably alluding to the use of oak bark for tanning. While the oaks probably dominated the natural forest cover of the Shropshire region, the two limes may well have been important also. Recent surveys have shown the small-leaved lime (*Tilia cordata*) to be quite widespread in the remaining fragments of supposedly ancient woodland and the large-leaved lime (*T. platyphyllos*) is almost certainly native in the Habberley Valley, the Much Wenlock area and Downton Gorge.

Ash (*Fraxinus excelsior*) is almost as common as oak in hedges. It is also abundant in mixed woods, and is a successful primary colonist of block screes of limestone or dolerite (see Chapter 6). Since the devastation caused by the outbreak of Dutch elm disease which began in the early 1970s it is difficult to visualise the former abundance of elm in Shropshire hedgerows and woods. In fact the English elm (*Ulmus procera*), a characteristic feature of Midland hedgerows, was not really common except in the south-east of our region. Wych elm (*U. glabra*), which reproduces freely by seed rather than suckers, is, however, still an important component of many broadleaved woodlands especially on heavy, base-rich soils. Unfortunately, even very young trees seem susceptible to elm disease and resistant strains have yet to be observed. Smooth-leaved elm (*U. carpinifolia*) is uncommon and probably planted where it occurs. Beech (*Fagus sylvatica*) also seems not to be native in our region and indeed the areas of pure beech wood are very limited, although the tree is naturalised in many places and some fine individual specimens occur in avenues and elsewhere. Hornbeam (*Carpinus betulus*) is also well to the north and west of its native area; it occurs mainly as an occasional hedgerow tree, and rarely as single trees in old natural woodlands including Tick Wood.

Field maple (*Acer campestre*), usually associated with hazel, is a useful clue to old woods and hedges. Its introduced relative, the sycamore (*A. pseudoplatanus*), is an all-too-successful invader of neglected woods and scrub, where it can flourish at the expense of native plants. Sweet chestnut (*Castanea sativa*) has been cultivated and coppiced locally for its useful timber.

In Britain and northern Europe birches and Scots pine commonly grow together on soils of low or moderate nutrient status. In our region the two birches and probably the hybrid between them are typical of secondary woodland, quickly invading felled areas or neglected pasture and scrubland. The silver birch (*Betula pendula*) favours drier soils while the downy birch (*B. pubescens*) is commoner on the peatlands of the northern plain. The pollen record indicates that in Shropshire the Scots pine (*Pinus sylvestris*), unlike the birches, almost certainly became extinct after its period of abundance in early post-glacial times, but within the past two or three centuries it has re-established itself from plantations and now regenerates freely on the New Red Sandstone hills and the drier peat mosses of north Shropshire. Other introduced conifers capable of regenerating from self-sown seed in our region include Douglas fir, western hemlock, Norway spruce, Sitka spruce, and both the European and Japanese larches.

The poetic association of wild cherry or gean (*Prunus avium*) with Wenlock Edge is fully justified on well-drained and especially lime-rich soils. It is a common element in old mixed woodlands and a vigorous coloniser of clearings. Its close relative, the bird cherry (*P. padus*), is often overlooked, although it is noticeable in certain summers when exposed trees become covered with the web-like threads of the bird cherry ermine moth caterpillar, which can cause virtual defoliation. It is mostly an upland tree, being found in wooded ravines and occasionally in damp hedgerows, forming tangled thickets in some marshy alder woods. In the lowlands it is found in a few peaty hollows, usually in small wet woods. The damson (*P. domestica*), once a valued supplement to meagre diets, is still common in smallholders' hedges. Solitary crab-apples (*Malus sylvestris*) in fields and woods often mark former field boundaries.

Rowan (*Sorbus aucuparia*) typically grows with birch on the poor soils of marginal hill-land and heaths, while the wild service tree (*S. torminalis*) is confined mainly to ancient mixed woodland. The common whitebeam (*S. aria*) is rare in Shropshire and probably always planted. Its rarer relatives *S. anglica* and *S. rupicola* are found wild on the cliffs of Blodwel Rock and Craig Breidden in the west of the region. Yew is a more abundant and equally typical native tree on the limestone and also occurs on the lighter but acidic soils of the Wyre Forest where woodmen were reluctant to fell it. Spindle (*Euonymus europaeus*) grows mainly on the limestone on woodland edges and as a colonist of disused quarries. It is found also on the edges of clay woodlands and in hedges on clay, but it is then less common than dogwood (*Cornus sanguinea*).

The holly (*Ilex aquifolium*) is of particular interest in Shropshire. There is a marked concentration of this tree in the hedges of smallholdings in the former "squatter" settlements on parish boundaries in the lowlands as well as the uplands. This may be linked with the former use of the evergreen leaves as winter fodder for livestock. There is also a remarkable population of ancient trees at The Hollies, the remains of a holly forest at an altitude of some 330m on Lord's Hill, above Snailbeach. The largest hollies here had a girth of about 1.6m when measured by Gardner (1951), who gives details of some notable Shropshire trees. More recent records of large trees, mostly conifers, are given in 7.9.

Aspen (*Populus tremula*) is a rather local associate of birch and rowan. The supposedly native true black poplar (*P. nigra*) is a fairly uncommon hedgerow and waterside tree in our area; hybrid poplars of various kinds are widely planted. A more common species of damp habitats is alder buckthorn (*Frangula alnus*), which is typical of the peatlands of north Shropshire where it often occurs in swampy carr woodland at the edges of mosses or meres, usually in the company of alder and various species of willow.

7.3 The importance of ancient woodlands

To the ecologist, not all woods are equal. Peterken (1981) has ranked types of woodland, in terms of origin and composition, according to their value for conservation. The most valuable is primary, semi-natural woodland, i.e. woodland which is composed of native trees and shrubs and which has been wooded since pre-historic times. Plantations of alien species on new sites are the least valuable, and secondary semi-natural woodland and plantations on ancient sites are intermediate in value.

Before the influence of man, most of Shropshire must have been covered by forest. Those areas which survived the clearance of most of the primary woodland have, undoubtedly, been managed for timber for centuries. However, there is evidence that some woods have been in existence for very long periods and are probably a relic of the primary forest. Ancient woods are the most valuable habitat for our woodland plants and animals, many of which are extremely slow to invade newly created woodland, particularly in the eastern counties where precipitation is low. As many woodland species fail to colonise secondary woodlands even after several centuries, the idea of exchanging new woods for old is most unsatisfactory in terms of conservation.

Primary woodland is of special value not only for the plants and animals for which it forms a habitat. Apart from certain wetlands and some remote upland areas, it forms the only link, albeit modified, with the primeval vegetation of Britain. Primary woodland contains soil profiles undisturbed by man which are a valuable resource for study and research. Many ancient woodlands contain archaelogical features, for example medieval boundary banks, and it can be argued that ancient woodlands are themselves archaeological and historical monuments of considerable importance (Rackham 1976, 1980).

Woodland survey for nature conservation has tended to concentrate on ancient woodland. Methods have been devised for the identification from maps of supposed ancient woodland; fieldwork is then used to evaluate the short-list so produced. Generally, this approach seems justified, at least in the lowlands, as evidence for the value of ancient woodland is clear. It has been suggested that the distinction between ancient and recent woodland is less clear in the uplands of north and west Britain. In any event, it is obviously not valid to assume that more recently established woods are of no interest ecologically or of no value for conservation. Recording for a County Flora must take into account those woods which are of more recent origin and which may, therefore, form a habitat for species which are rapid colonisers, indicative of disturbed ground, or intolerant of shade. Many of these are, of course, more characteristic of open habitats, but nonetheless it is necessary to recognise the value of secondary and recent woodland for some plant species.

7.4 Forest change

Since the establishment of the Forestry Commission in 1919, a large proportion of the woods of Shropshire have been totally changed by re-afforestation with conifers. Nearly all the hilltop woods of south-west Shropshire now consist of regular rows of spruce, larch, pine and fir, and elsewhere in the county fast-growing conifers have made inroads into our semi-natural broad-leaved woods. Private woodland owners have also carried out a great deal of re-afforestation, although often with a proportion of broadleaves. The result is that only a comparatively small fraction of Shropshire's woodland now consists of ancient broadleaved woods. The proportion, but not the area, is reduced yet further by the creation of new plantations on land which was previously moorland or rough grassland, although the establishment of totally new plantations is much less common in Shropshire than over the border in Wales.

Some recently produced statistics give an indication of the nature and distribution of woodland in Shropshire (see Table 7.1). Much of the information was produced in the course of surveys carried out by the Nature Conservancy Council in order to locate and evaluate woodland areas of particular ecological and historical interest. Woods over 2ha (about five acres) in extent occupy some 20 000ha (about 40 900 acres), which is approximately 6% of the area of Shropshire. Roughly half of this is ancient (10 517ha or 25 900 acres). Of the ancient woods, 39% are semi-natural and 61% replanted with conifers or alien broadleaved trees. About 20% of all woodland in Shropshire, therefore, is ancient and semi-natural – the category of woodland which is most important for woodland plants. This represents roughly 1.25% of the area of the county.

Table 7.1 *Numbers and types of Shropshire woods with an area exceeding 2 hectares (from NCC survey by I C Bolt 1977).*

Total number of woods over 2 hectares in 1975	
Post – 1830 woods	
– broadleaved	392
– coniferous	286
– mixed	153
– separate broadleaved and coniferous areas	30
– CLEARED	27
Total	888
Pre-1830 woods	
– broadleaved	212*
– coniferous	248
– mixed	161
– separate broadleaved and coniferous areas	
broadleaved component > 2ha	33*
–broadleaved component < 2ha	41
– CLEARED	21
– broadleaved, but rejected because of obviously secondary name, shape, etc.	371
Total	1087

* The number of ancient, broadleaved woodland areas exceeding 2 hectares in area = 212 + 33 = 245. Many of these 245 woods had been spoilt by excessive grazing, domination by woodland aliens and other factors, leaving a final short list of 129 ancient, broadleaved, ecologically interesting woods.

Re-afforestation of ancient woodland with conifers causes a great change in the flora, sometimes involving the almost complete obliteration of woodland herbs by shading and the accumulation of thick, infertile litter when the trees close canopy. However, wildflowers persist along rides, in larchwoods, and in other places where the shade is less intense. Clearance of woodland for agriculture causes total loss of the woodland plants. Between the production of the 1:25000 (2½ inch) map series (based in part on field mapping in the first half of the twentieth century) and 1981, 5.7% of ancient woodland in Shropshire was cleared for agriculture. Such clearance, like replanting, continues although large scale felling is controlled by felling licence procedures, and usually permitted only if followed by replanting. Modern tree plantings have been greatly affected by susceptibility to disease and exposure; the influences of soil type, drainage and topography upon twentieth century silviculture are discussed in Chapter 3.5.

The supposition that ancient woodland is more valuable for wildlife than more recently established woods, and the fact that woods, unlike many other habitats, are not only mapped but usually mapped accurately, have been exploited in survey work. By using maps, it is possible to select woods which are probably ancient, and which justify field survey. This method has been used by the Nature Conservancy Council in a number of counties, including Shropshire, where the work was carried out by I C Bolt. The first edition Ordnance Survey maps, produced in the early part of the nineteenth century, are a useful criterion in distinguishing ancient from recent woodland. The first edition OS maps for Shropshire were published in the 1830s, but based on surveys carried out during the previous fifteen or twenty years. Thus it is possible, by comparison of the first edition and later maps, to tell which woods were in existence in the early nineteenth century and which are recent plantations. Moreover, the use of maps often enables one to determine which woods existing in the early 1800s were established in the previous few years; names and shapes are useful evidence, and the correlation of amenity woods with eighteenth century landscaping may enable the surveyor to make assumptions about their origin.

7.5 Classification of woodland and scrub communities

Two systems of classifying British woodlands are of particular relevance to the Shropshire region. Woodland descriptions made for the Nature Conservancy Council by the method of Peterken (1981) involve herbs, shrubs and trees, but his actual classification depends on the species of trees and shrubs present. This development of a traditional approach to woodland classification has been used by us with regard to the description of many of the older and larger semi-natural woodlands, including those investigated by I C Bolt in 1977. In contrast, Bunce (1982) uses the bryophytes, herbs, shrubs and trees present in a series of 200m² sample plots to place each stand in one of 32 plot types, using a computer-generated key based on indicator species analysis of a large number of British woodlands. With a woodland of any size 16 plots are taken and the woodland itself is ascribed to one of 16 site types. As the numbers of bryophytes, herbs and dwarf shrubs so greatly exceed those of the shrubs and trees, they exert a predominant influence on the classification and this method is of particular value in elucidating relationships between soils and vegetation. While we have not used his key, our methods for the field layer vegetation resemble those of Bunce. In the indicator species analysis of our 5m × 5m stands, however, the names of all trees, tree seedlings and saplings were omitted so that the process of classification was not in any way influenced by the canopy species, though it is recognised that the trees and shrubs exert a direct influence on the environment of the plants beneath them.

To place the recording of the field layer vegetation on a firm statistical basis would require several hundred samples, and more space than can be afforded in this Flora. The selection shown in Table 7.3 is, therefore, a personal one designed to show stands that are typical of, or peculiar to, the Shropshire region.

Table 7.2 *Types of British semi-natural woodland found in the Shropshire region.*

The classification outlined below was developed by G F Peterken (1981). It is in the tradition of Tansley (1939) and seeks to refine and develop his units. It has an ecological basis, the stand groups being defined on the occurrence of 13 woody species. Though the classification depends primarily on combinations of tree and shrub species, site factors are also employed and the ground flora is recorded. There are 39 *stand types* (some divided into sub-types not shown here) arranged into 12 *stand groups*. Each stand type can be regarded as a nodal point in a multidimensional continuum and there are inevitably intermediates.

Where the stand type is present in Shropshire it is printed in bold type and an example is given.

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1 ASH-WYCH ELM WOODLAND
1A **Calcareous ash-wych elm woods**
e.g. Blodwel Wood
1B **Wet ash-wych elm woods**
e.g. College Coppice
1C **Calcareous ash-wych elm woods on dry and/or heavy soils**
e.g. Tick Wood
1D **Western valley ash-wych elm woods**
e.g. Habberley Valley

2 ASH–MAPLE WOODLAND
2A **Wet ash-maple woods**
e.g. Incham Coppice (part)
2B Ash-maple woods on light soils
2C **Dry ash-maple woods**
e.g. Coats Wood, Wenlock Edge

3 HAZEL-ASH WOODLAND
3A **Acid pedunculate oak-hazel-ash woods**
e.g. Hargrove Wood
3B **Southern calcareous hazel-ash woods**
e.g. Sallow Coppice, Limekiln Wood
3C Northern calcareous hazel-ash woods
3D **Acid sessile oak-hazel-ash woods**
e.g. Saplins Wood

4 ASH-LIME WOODLAND
4A Acid birch-ash-lime woods
4B Maple-ash-lime woods
4C **Sessile oak-ash-lime woods**
e.g. Tick Wood

5 ACID OAK-LIME WOODLAND
5A Acid pedunculate oak-lime woods
5B **Acid sessile oak-lime woods**
e.g. Hawthorn Dingle

6 BIRCH-OAK WOODLAND
6A **Upland sessile oak woods**
e.g. Clunton Coppice
6B Upland pedunculate (and mixed) oak woods
6C **Lowland sessile (and mixed) oak woods**
e.g. Wyre Forest
6D **Lowland pedunculate oak woods**
e.g. Rough Marl

7 ALDER WOODLAND
7A **Valley alder woods on mineral soils**
e.g. Thatchers Wood (part), Brook Coppice
7B **Wet valley alder woods**
e.g. White Mere, Sweat Mere
7C Plateau alder woods
7D Slope alder woods
7E **Bird cherry-alder woods**
e.g. Flat Coppice, Plowden Wood

8 BEECH WOODLAND[1]
8A Acid sessile oak-beech woods
8B Acid pedunculate oak-beech woods
8C Calcareous pedunculate oak-ash-beech woods
8D Acid pedunculate oak-ash-beech woods
8E Sessile oak-ash-beech woods

9 HORNBEAM WOODLAND
9A Pedunculate oak-hornbeam woods
9B Sessile oak-hornbeam woods

10 SUCKERING ELM WOODLAND
10A **Invasive elm woods**
10B Valley elm woods

11 PINE WOODLAND[2]
11A Acid birch-pine woods
11B Acid oak-pine woods
11C Calcareous pine woods

12 BIRCH WOODLAND[2]
12A (Rowan-) Birch woods
12B Hazel-birch woods

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[1] Some planted beech woods conform to this category.

[2] Some secondary woods undergoing the early stages of natural succession can be classified as pine or birch woods in Shropshire.

7.6 Types of semi-natural woodland in Shropshire

In Table 7.2 the ancient, semi-natural woodlands of Britain are divided into a series of stand groups, each characterised by the presence of one or two tree species. All the stand groups can be further divided on the basis of other species and site characteristics into several stand types. Thus ash-wych elm woodland comprises stand group 1, which can be subdivided into the stand types 1A, calcareous ash-wych elm woodland; 1B, wet ash-wych elm woodland; 1C, calcareous ash-wych elm woodland on dry and/or heavy soil; and 1D, western valley ash-wych elm woodland. Further details of this classification are given by Peterken (1981).

In Shropshire, seven or possibly eight of the 12 stand groups are represented. The unrepresented groups are, with the exception of birch (group 12), characterised by species not found in Shropshire as indigenous trees (i.e. beech, hornbeam and pine). Birch woodland does, of course, occur in the county, as secondary woodland which is usually replaced by oak eventually. It also occurs as a seral stage in areas of primary woodland, such as the Wyre Forest, after ancient large trees are blown down.

The most obvious distinction in Shropshire woods is between the sessile oak woods of acidic, usually freely drained soils, and the mixed deciduous woods of more base-rich (and often damper) soils. Sessile oak woods are, in Peterken's classification, characterised by the absence of ash, elms, field maple (*Acer campestre*), lime and alder. Compared with the woods of more fertile soils, they are poor in tree and shrub species. The trees and shrubs most commonly associated with sessile oak are birch, rowan, holly and, on somewhat richer soils, hazel. The field layer in such woods varies considerably, depending upon soil depth and fertility, but commonly consists mainly of calcifuge species, including, in the more acidic examples, heather (ling), bilberry and common cow-wheat.

Apart from alder, which dominates a distinctive group of woodlands on wet soils, woodland types characterised by species other than oak and birch are often grouped as "mixed deciduous woodland". This grouping recognises the fact that the main difference between different stand types is often just the presence or absence of one or two tree species within a site in which soil, drainage and field layer variations are much less obvious. In Shropshire woods, examples of stand types 1 (ash and wych elm), 2 (ash and field maple), 3 (ash and hazel) occupy similar sites and grade into one another, depending on the presence of wych elm and field maple. The field layer in such woods consists largely of calcicole species, including sweet woodruff, ramsons and sanicle. Bramble is often abundant.

Small-leaved lime is a component of some of the ash-wych elm woods of Wenlock Edge, the Severn Gorge area and Blodwel Wood. In a few woods large-leaved lime occurs also. Ash and lime stands occur where wych elm and field maple are absent. Lime and oak stands occur in a small number of woods in south-east Shropshire, but stands with lime away from the predominantly ash-wych elm woods of the limestone are rare.

Alder woodland, as carr, is frequent in association with the meres and mosses of North Shropshire. This type of woodland has developed on peat, usually in comparatively recent years, as a successional stage. Elsewhere, alder is dominant alongside streams and in a small number of plateau or slope sites where the water table is near the surface as a result of flushing or impeded drainage.

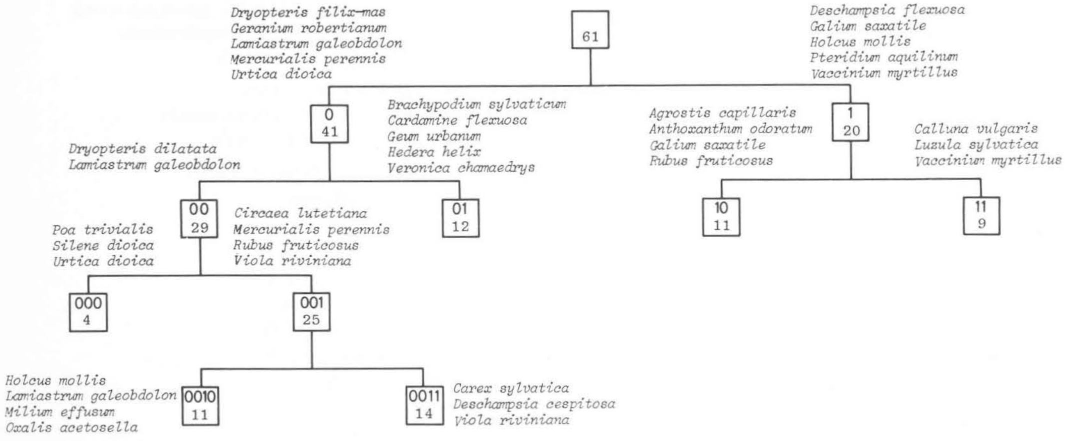

Figure 7.2 *Indicator species analysis of sixty-one 5 × 5m woodland stands from the Shropshire Region. Group notations are shown in heavy type. The other figures in the squares give the numbers of the stands in each group. The most important division species are shown at each separation, each species being arranged on the side in which it tends to be present.*

7.7 Computer analysis of the field layer vegetation

The initial division is into generally well drained heathy woodlands (Group 1) and a much larger group, shown on the left, of damper, less acid sites (Group 0). Comparisons between the indicator species analysis (Fig. 7.2) the environmental and species richness data (Fig. 7.3), and the stand-species matrix for 42 of the 61 stands considered (Table 7.3) show that the computer programme, whose mode of operation is explained on p. 78, has arranged the stands in an ecologically sound manner. The reader can confirm this by checking Table 7.3 for the five species selected by the programme as indicators of the woodlands characterised by heathy plants (Group 1). Wavy hair-grass, bilberry and heath bedstraw were entirely absent from Group 0, while bracken was found in only two stands out of the 41 in the whole of Group 0. Creeping soft-grass, the worst indicator of the five, is found in ten Group 0 quadrats. This species is actually an indicator for Group 0010, thus emphasising the point that this method of classification (see Hill, Bunce and Shaw 1975) uses the whole of the stand-species data, so the fact that a species has been selected for one side of a division does not necessarily imply that it is absent from all the stands in the other side of the division. Nevertheless, the chance of creeping soft-grass being in a stand allocated to Group 1 is more than double that of it being in a stand belonging to Group 0.

GROUP 1 INDICATORS
Deschampsia flexuosa, Vaccinium myrtillus, Galium saxatile, Pteridium aquilinum, Holcus mollis

Group 1 is characterised by heathy plants growing with one or two exceptions (Table 7.3, stands 34, 42) on markedly acid soils that are often rather dry, while the much larger Group 0 consists of stands in which plants of moister and generally less acid soils are abundant. The first divisions of woodland stands of the same size in the Telford region (Tobin 1983) and of some smaller ($1 m^2$) quadrats in the Wyre Forest (Packham and Willis 1976) are on similar lines, the latter being of interest in that bryophytes are used in addition to the ferns, herbs and dwarf shrubs employed in the present analysis and that of Tobin (1983). The soils of Group 11 are the most acid and least species rich of all the groups; it is particularly noticeable that all but one occurrence of ling is in this group, every stand of which includes wavy hair-grass. This species is the only vascular plant in stand 39 although heath bedstraw grows nearby; the nine bryophytes present are characteristic of acid heathy woodland.

Calluna vulgaris (a calcifuge)

STAND 39 (heathy oakwood)
Deschampsia flexuosa, Aulacomnium androgynum, Dicranum majus, D. scoparium, Hypnum cupressiforme, Lepidozia reptans, Orthodontium lineare, Plagiothecium denticulatum complex, *P. undulatum, Tetraphis pellucida*

Stand 39 is from a hybrid oakwood growing on the acid rhyolite of the **Ercall**, near Wellington. A newcomer to the woodlands of Shropshire would do well to start in the immediate neighbourhood of this hill where abrupt changes in geology, drainage, soils and vegetation occur within a very short distance (see Fig. 3.15): seven other stands from this area are shown in Table 7.3. Stand 37 (birch scrub on Cambrian quartzite) and stand 38 (hybrid oakwood on granophyre) are in Group 11 along with stand 39. Stand 3 (Group 000), stands 6 and 9 (Group 0010), stand 11 (Group 0011) and stand 22 (Group 01) are very different, yet the woods in which they are located can all be visited in a day.

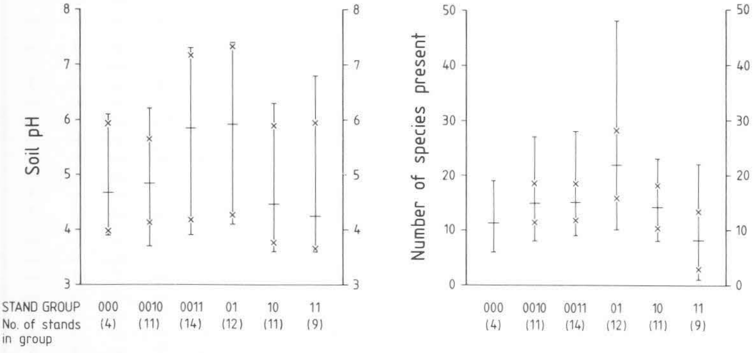

Figure 7.3 *Soil pH and species density (per 25 m^2) for the major polythetic divisive groups in sixty-one woodland or scrub stands from the Shropshire Region. Each vertical bar shows the mean and the individual maximum and minimum values found within each group. For species density the crosses show 95% confidence limits, while for soil pH the crosses indicate the highest and lowest means of five pH values (at 0–5 cm depth) found in any one stand.*

Table 7.3 *Stand-species matrix for 42 of the woodland plots, each of which was 5m × 5m. The tree and shrub species indicated belong to the canopy immediately above the plots. Cover abundance values (recorded on the Domin scale) are given for field layer species. Symbols used are: s, present as seedling; spl, present as sapling; v, very variable, †, present.*

	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	POLYTHETIC DIVISIVE GROUP	000				0010					0011							
	Altitude (m)	15	275	163	15	77	200	170	105	179	60	180	114	61	150	260	220	70
	Aspect	0	W	N	0	ESE	E	WSW	SE	W	ENE	NNE	NN	SSE	E	NW	NW	WSW
	Slope (°)	0	12	20	0	6	4	3	3	30	10v	20	32	35	40	25	25	10
	Max.	4·1	4·7	4·4	6·1	4·7	6·2	5·8	4·4	4·9	6·7	7·2	6·7	5·9	5·4	7·0	6·6	7·3
	Soil pH Mean	3·96	4·64	4·12	5·92	4·32	5·64	5·62	4·12	4·55	6·46	6·87	6·59	5·3	5·26	6·84	6·40	7·18
	at 0–5cm Min.	3·9	4·6	3·9	5·8	4·0	4·4	5·5	3·7	4·3	6·3	6·7	6·5	4·7	5·1	6·6	6·2	7·1
1	*Acer pseudoplatanus*	—	†	†	—	spl	—	s	—	—	—	—	—	†s	—	—	—	s
2	*Aesculus hippocastanum*	—	—	—	—	—	—	—	—	—	†	—	—	—	—	—	—	—
3	*Alnus glutinosa*	—	—	—	†	—	†	—	—	—	—	†	—	—	†	—	—	—
4	*Betula pendula*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
5	*B. pubescens*	†	—	—	†	†	—	—	—	—	—	—	—	—	—	—	—	—
6	*Betula* sp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	*Corylus avellana*	—	—	—	—	†	—	†	†	—	†	s	—	—	†	—	†	†
8	*Crataegus monogyna*	—	—	—	—	—	—	—	—	—	s	—	—	—	—	—	—	—
9	*Fagus sylvatica*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	†	—	—
10	*Fraxinus excelsior*	—	—	s	—	—	—	—	—	s	†s	s	s	—	s	s	†s	—
11	*Ilex aquifolium*	—	—	—	—	—	—	—	—	—	—	—	s	—	—	—	—	—
12	*Prunus avium*	—	—	—	—	—	—	—	—	—	—	—	†	—	—	—	—	—
13	*Picea abies*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14	*Pinus sylvestris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15	*Quercus petraea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	*Q. robur*	—	—	—	—	†	—	†	†	†	—	—	—	—	—	—	—	—
17	*Q. petraea x robur*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18	*Salix caprea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19	*S. cinerea*	—	—	—	†	—	—	—	—	—	—	—	—	—	—	—	—	†s
20	*Sambucus nigra*	—	—	—	—	—	—	—	†s	—	—	—	—	—	—	—	—	—
21	*Sorbus aucuparia*	†s	—	—	—	—	—	—	—	†	—	—	—	—	—	—	—	—
22	*Taxus baccata*	—	—	—	—	—	—	—	—	—	—	†	—	—	—	—	—	—
23	*Tilia cordata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24	*T. × europaea*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	†	—
25	*T. platyphyllos*	—	—	—	—	—	—	—	—	—	—	—	—	—	†	—	—	—
26	*Ulmus glabra*	—	—	—	—	—	—	—	—	†	†	—	s	—	—	—	—	—
1	*Athyrium filix-femina*	—	—	—	—	—	1	—	—	—	—	2	1	—	—	—	2	—
2	*Blechnum spicant*	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—
3	*Dryopteris carthusiana*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	*D. dilatata*	5	1	1	3	2	1	1	—	—	2	2	—	—	1	—	2	2
5	*D. filix-mas*	—	5	1	—	4	2	3	3	—	2	4	4	4	2	—	2	1
6	*Phyllitis scolopendrium*	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—
7	*Polystichum aculeatum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	*P. setiferum*	—	—	—	—	—	—	—	—	—	—	—	4	—	4	—	—	—
9	*Pteridium aquilinum*	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—
1	*Adoxa moschatellina*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	*Agrostis canina*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	*A. capillaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	*Ajuga reptans*	—	—	—	—	—	3	—	—	—	—	4	—	—	—	—	—	—
5	*Alliaria petiolata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	*Allium ursinum*	—	—	—	—	—	—	—	—	—	1	3	—	—	4	1	—	—
7	*Anemone nemorosa*	—	—	—	—	1	—	—	—	—	4	—	—	2	—	2	—	4
8	*Anthoxanthum odoratum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	*Arctium minus*	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—
10	*Arrhenatherum elatius*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11	*Arum maculatum*	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—
12	*Bellis perennis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13	*Brachypodium sylvaticum*	—	—	—	—	—	—	—	—	1	—	—	—	—	4	—	—	3
14	*Bromus ramosus*	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—
15	*Calluna vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	*Caltha palustris*	—	—	—	3	—	3	—	—	—	—	1	—	—	—	—	—	—
17	*Cardamine flexuosa*	—	—	—	3	—	3	—	—	—	—	2	—	—	—	—	—	—
18	*Carex pendula*	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—
19	*C. remota*	—	—	—	—	—	4	—	—	—	—	2	—	—	—	—	—	3
20	*C. sylvatica*	—	—	—	—	—	—	—	—	—	—	2	1	—	—	—	2	3
21	*Chamerion angustifolium*	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
22	*Chrysosplenium oppositifolium*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
23	*Circaea lutetiana*	—	—	—	—	—	2	3	—	—	—	2	1	—	—	1	1	—
24	*Clematis vitalba*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25	*Corydalis claviculata*	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—
26	*Dactylis glomerata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
27	*Deschampsia cespitosa*	—	1	—	—	—	3	—	—	—	4	—	—	—	7	—	3	5
28	*D. flexuosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
29	*Digitalis purpurea*	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
30	*Epilobium montanum*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
31	*Euphorbia amygdaloides*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	*Festuca gigantea*	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	2
33	*F. ovina*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
34	*F. rubra*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
35	*Filipendula ulmaria*	—	—	—	—	—	—	7	—	—	—	2	—	—	—	—	—	3

Site locations and additional species are shown at the foot of the table.

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
					01										10							11			
25	61	76	122	206	107	76	220	165	185	90	108	130	260	107	300	100	218	90	238	205	220	96	155	90	
E	N	SSE	NW	W	WNW	W	v	N	E	W	v	E	0	NE	NW	SE	NE	NNW	ESE	NNW	NW	NW	SSW	NW	
48	5	30	15	10	2	5	v	28	15	45	v	30	0	10	20	4	8	25	28	30	25	6	30	20	
5·3	5·8	6·7	6·6	5·6	4·4	4·6	7·2	7·4	7·3	7·1	4·0	4·8	5·4	5·1	4·1	6·3	3·9	4·3	4·1	3·7	3·9	4·4	4·8	6·8	
4·96	5·32	6·56	6·12	5·12	4·26	4·36	7·14	7·33	7·17	6·78	3·76	4·34	4·78	4·57	4·06	5·9	3·78	4·18	3·86	3·65	3·76	4·16	4·40	5·96	
4·7	4·8	6·4	5·8	4·8	4·1	4·2	7·1	7·2	7·1	6·6	3·6	3·9	4·3	4·3	3·9	5·0	3·7	4·0	3·7	3·6	3·6	3·8	4·2	4·7	
					CANOPY																				
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s	†s	†s	s	†	—	—	†s	spl	—	s	—	s	s	—	—	spl	—	—	—	—	—	—	—	—	10
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					FIELD LAYER																				
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4	—	1	2	2	2	—	—	—	—	—	—	4	—	—	—	—	2	—	—	—	—	—	—	1	5
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1	—	—	—	2	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11
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1	4	4	—	4	3	2	4	4	4	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13
—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3	2	—	2	2	—	15
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—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22
3	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	23
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—	4	—	—	5	3	—	—	—	—	—	—	5	4	—	—	—	—	—	—	—	—	—	—	3	27
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35

36	*Fragaria vesca*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
37	*Galium aparine*	—	2	—	—	—	—	3	—	1	—	—	—	—	—	—	—	4
38	*G. odoratum*	—	—	—	—	—	—	2	—	1	9	—	—	—	—	—	—	1
39	*G. palustre*	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—
40	*G. saxatile*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
41	*Geranium robertianum*	3	—	—	—	—	2	2	—	—	—	2	—	—	3	—	—	2
42	*Geum urbanum*	—	—	—	—	—	—	4	—	—	—	—	1	—	2	—	—	—
43	*Glechoma hederacea*	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	2
44	*Hedera helix*	—	—	—	—	—	—	2	—	1	4	2	—	—	—	—	—	3
45	*Holcus lanatus*	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
46	*H. mollis*	—	4	—	—	—	4	—	7	8	—	—	—	—	—	—	—	—
47	*Hyacinthoides non-scripta*	—	3	4	—	9	3	3	8	7	—	—	—	—	—	4	—	—
48	*Hypericum pulchrum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
49	*Iris pseudacorus*	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	2
50	*Juncus effusus*	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—
51	*Lamiastrum galeobdolon*	—	5	3	—	5	4	4	4	3	4	4	—	4	—	—	—	2
52	*Lolium perenne*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
53	*Lonicera periclymenum*	3	—	—	—	1	1	—	—	1	—	2	3	—	—	—	—	—
54	*Luzula campestris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
55	*L. pilosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
56	*L. sylvatica*	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	1	—
57	*Lysimachia nemorum*	—	—	—	—	1	4	—	—	—	—	2	—	—	—	—	—	3
58	*Melica uniflora*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
59	*Mercurialis perennis*	—	—	—	—	—	1	4	—	—	4	2	7	5	—	6	4	5
60	*Milium effusum*	—	—	—	—	—	2	—	5	1	—	—	—	—	—	—	—	—
61	*Moehringia trinervia*	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
62	*Mycelis muralis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
63	*Origanum vulgare*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	*Oxalis acetosella*	7	3	—	—	4	3	2	2	1	—	—	—	—	2	—	—	—
65	*Poa annua*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
66	*P. nemoralis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
67	*P. pratensis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
68	*P. trivialis*	3	2	—	3	—	6	—	—	—	—	—	—	—	—	1	2	4
69	*Primula veris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
70	*P. vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
71	*Ranunculus ficaria*	—	—	—	—	—	4	—	—	—	—	—	—	5	—	—	—	—
72	*R. repens*	—	—	—	1	—	2	—	—	—	—	1	—	—	—	—	—	—
73	*Rosa* spp.	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	2
74	*Rubus fruticosus* agg.	1	2	—	—	4	3	3	2	4	4	5	3	—	4	—	4	3
75	*Sanicula europaea*	—	—	—	—	—	—	—	—	—	—	—	—	—	1	4	—	—
76	*Silene dioica*	2	4	—	—	—	—	4	1	—	—	—	—	—	—	—	—	—
77	*Solanum dulcamara*	—	—	—	4	—	—	—	—	—	—	2	—	—	—	—	—	1
78	*Stachys sylvatica*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
79	*Stellaria holostea*	—	—	—	—	—	3	—	3	2	—	—	—	—	—	—	—	—
80	*Taraxacum officinale*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
81	*Teucrium scorodonia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
82	*Urtica dioica*	—	—	1	2	—	—	2	—	—	—	—	—	3	—	—	—	2
83	*Vaccinium myrtillus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
84	*Valeriana officinalis*	—	—	—	—	—	5	—	—	—	—	2	—	—	—	—	—	—
85	*Veronica chamaedrys*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
86	*V. montana*	—	—	—	—	—	1	—	—	—	3	3	2	—	—	—	—	—
87	*Viburnum opulus*	—	—	—	—	—	—	—	—	—	3	5	—	—	—	—	—	—
88	*Viola riviniana*	—	—	—	—	—	—	—	—	—	2	—	—	—	—	2	—	—
NO. OF FIELD LAYER SPECIES		9	11	6	19	11	27	20	12	14	15	24	11	9	12	8	12	28
	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

GROUP 000

1 Birchwood (*Betula pubescens*) at Sweat Mere. National Grid Reference SJ 436305. Peat over glacial till.

2 Fron Wood, Mainstone. Planted stand of sycamore in the upper, less steeply sloping area of a very mixed deciduous wood. SO 277875. Stony loam.

3 Dry sycamore wood at Lawrence's Hill, near Wellington, Telford. SJ 639094. Acid brown soil over rhyolite.

4 Fen carr at Sweat Mere. SJ 437306. Litter over glacial till. (*Thelypteris thelypteroides* 5, *Carex elata* 3, *C.paniculata* 3, *Lycopus europaeus* 2, *Lythrum salicaria* 2, *Rumex sanguineus* 1, *Scutellaria galericulata* 1, *Typha angustifolia* 2).

GROUP 0010

5 Mixed deciduous woodland, north side of Seckley Ravine, Wyre Forest, Worcs. SO 763787. Acid brown soil over Kinlet Beds (Middle Coal Measures).

6 Streamside alderwood on alluvium east of the Ercall, near Wellington. SJ 647097. Damp silty clay loam. (*Agrostis stolonifera* 2).

7 Hampton Beech, a damp mixed deciduous wood. SJ 302052. Medium clay soil over alluvium. (*Prunus spinosa* s.2, *Rosa arvensis* 2).

8 Hazel coppice with pedunculate oak standards at Holly Coppice, near Haughmond Hill. SJ 549151. Brown earth over Longmyndian sediments of the Stretton Series, (*Rumex* sp.1).

9 Mixed deciduous wood on slope between Lawrence's Hill and Maddock's Hill, near Wellington, Telford. SJ 643089. Brown earth (clay loam) over glacial till.

GROUP 0011

10 Mixed deciduous woodland at Loamhole Dingle, Ironbridge. SJ 664057. Brown earth over Wenlock Shales.

11 Wet alder wood at Limekiln Hill, near Wellington, Telford. SJ 652097. Humic brown soil with occasional patches of acid yew litter over Carboniferous sediments (*Valeriana dioica* 4).

12 Flush under wild cherry in Tick Wood, near Buildwas. SJ 642034. Brown earth (medium-heavy clay) over siltstones of the Tickwood Beds (Wenlock Series).

13 Sycamore wood in Badger Dingle, near Ackleton. SO 766993. Sandy brown soil over fluvioglacial sands and gravels resting on Triassic soft mottled sandstone. (*Ribes rubrum* 1).

14 Oaks Wood, a mixed deciduous woodland in the Habberley Valley, near Pontesbury. SJ 412046. Brown earth (medium clay).

15 Beechwood at Blakeway Coppice, Wenlock Edge. SO 601994 Brown earth over Wenlock Shales (Silurian).

16 Easthope Wood, a mixed deciduous woodland on Wenlock Edge. SO 553946. Brown soil on Wenlock Shales.

17 Flushed area of Weir Coppice, Shrewsbury. SJ 462094. Organic soil over Keele Beds. (Upper Coal Measures). (*Equisetum arvense* 1, *E.telmateia* 5, *Angelica sylvestris* 1, *Calystegia sepium* 1).

GROUP 01

18 Sycamore/alder woodland by the Severn near Trimpley Reservoir, Worcs. SO 765787. Brown earth over alluvial deposits. (*Anthriscus sylvestris* 1, *Veronica hederifolia* 3, *Vicia cracca* 1).

19 Wet stream bank in Eyemore Wood, near Upper Arley. SO 776800. Damp organic silt over alluvium. (*Carex strigosa* 5).

20 Dry ashwood at Weir Coppice, Shrewsbury. SJ 462096. Very stony loamy sand over Keele Beds (Upper Coal Measures). (*Elymus caninus* 1, *Campanula trachelium* 1, *Carduus acanthoides* 1, *Lapsana communis* 2, *Myosotis arvensis* 1).

21 Mixed deciduous woodland in Tick Wood, near Buildwas. SJ 643035. Brown earth (medium clay) over Wenlock Shales (*Acer campestre* s.).

22 Mixed deciduous woodland east of the Ercall, near Wellington. SJ 647097. Brown earth on glacial till.

23 Margin of Norway Spruce plantation, Wyre Forest plateau, Worcs. SO 761778. Acid brown soil over Coal Measures. (*Carex binervis* 2,

—	—	—	—	—	—	—	—	4	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	36
—	1	3	—	—	—	—	3	—	1	2	—	—	—	—	1	1	—	—	—	—	—	—	—	—	37
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	39
—	—	—	—	—	—	—	—	—	—	—	3	1	2	1	2	—	2	—	—	—	—	—	3	—	40
—	2	4	1	3	1	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41
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2	—	4	7	3	—	3	4	4	—	4	—	1	—	—	—	10	—	—	—	—	—	—	—	—	44
—	—	—	—	1	4	—	—	—	—	—	—	—	2	—	2	1	—	—	—	—	—	—	—	—	45
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—	—	3	—	2	3	—	—	—	—	—	—	—	—	—	2	—	2	—	—	—	—	—	—	—	47
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1	—	1	—	—	—	—	—	—	—	2	—	—	—	1	—	—	—	—	—	—	—	—	—	—	61
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7	1	5	9	5	4	—	4	—	2	1	3	5	5	4	2	1	—	—	—	—	—	2	1	4	74
1	—	—	3	2	—	3	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	75
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	76
—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77
—	—	—	—	—	2	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	78
—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	79
—	—	—	—	—	—	1	3	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	80
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	87
—	4	1	1	1	1	3	—	3	3	—	—	—	2	1	2	—	—	—	—	—	—	—	1	—	88
27	18	23	10	18	26	11	23	21	48	24	8	13	22	19	19	12	9	9	4	3	1	9	15	22	
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

Cirsium palustre 1, *C.vulgare* 1, *Epilobium ciliatum* 1, *Hypericum* sp.1, *Scrophularia nodosa* 2).

24 Mature beechwood at Haughmond Hill, near Shrewsbury. SJ 535139. Acid brown loam over Keele Beds (Upper Coal Measures).

25 Scrubby woodland on old kiln site somewhat above quarry base, Wenlock Edge. SO 609998. Very stony soil. Parent material dumped but probably local in origin; site is part of an old quarry in the Wenlock Limestone. (*Chaerophyllum temulentum* 4, *Heracleum sphondylium* 1, *Plantago major* 1, *Ranunculus auricomus* 2, *Tamus communis* 4).

26 Mixed woodland on scree below Blodwel Rock, near Pant. SJ 266233. Rendzina with dark organic A horizon over irregular blocks of Carboniferous Limestone. (*Asplenium trichomanes* 1, *Campanula rotundifolia* 1, *Senecio jacobaea* 1, *Thuja plicata* spl 1).

27 Mixed scrubby woodland including *Quercus robur* and *Fraxinus excelsior*, above Blodwel Rock, near Pant. SJ 267231. Clay loam to medium clay probably derived from shallow layer of head resting on Carboniferous Limestone. (*Arabis hirsuta* 1, *Bromus hordeaceus* 3, *B.sterilis* 1, *Carex nigra* 1, *Cirsium arvense* 2, *Daucus carota* 1, *Geranium dissectum* 1, *Helianthemum nummularium* 1, *Hypericum maculatum* 1, *H.montanum* 2, *Orchis mascula* 1, *Lotus corniculatus* 1, *Pimpinella saxifraga* 1, *Plantago lanceolata* 2, *Sanguisorba minor* 1, *Ranunculus acris* 1, *Rumex acetosa* 2, *Senecio vulgaris* 2, *Viola hirta* 2).

28 Open beechwood above High Rock, Bridgnorth SO 725939. Base-rich sandy soil over Triassic sandstone. (*Arctium* sp.1, *Arenaria leptoclados* 2, *Astragalus glycyphyllos* 4, *Cerastium semidecandrum* 1, *Desmazeria rigida* 3, *Hieracium* sp.2, *H.pilosella* 1, *Sedum acre* 2, *Taraxacum* sect. *Erythrosperma* 2, *Thymus praecox* 1).

GROUP 10

29 Mature Scots pine plantation near Buttonoak, Wyre Forest plateau, Worcs. SO 761778. Acid brown soil over Coal Measures.

30 Mixed deciduous woodland at Benthall Edge, near Ironbridge. SJ 666034. Clays of Glacial Drift (over sandstones of Lower Coal Measures).

31 Damp deciduous woodland in Brook Coppice. SJ 394012. Very humose soil over Shineton Shales (Upper Cambrian). (*Equisetum sylvaticum* 3, *Carex laevigata* 2, *Rubus idaeus* 4).

32 Remnant of ancient oakwood, near Buttonoak, Wyre Forest plateau, Worcs. SO 759778. Acid brown soil over Coal Measures.

33 Mixed deciduous woodland on Breidden Hill, Powys. SJ 293146. Humic loam over dolerite.

34 Mixed deciduous woodland with abundant birch on deserted pit heap at Muxton Bridge, Telford. SJ 732133. Pit waste, mainly of shale fragments, has burnt spontaneously in many places. Surface weathering has caused fragmentation of well drained spoil in which humus has now accumulated (*Hieracium* sp.1).

35 Coppiced sessile oakwood, Poles Coppice, near Pontesbury. SJ 391045. Very humose loam over Stiperstones Quartzite (Ordovician). (*Melampyrum pratense* 3).

GROUP 11

36 Acid pedunculate oakwood on southern side of Seckley Ravine, Wyre Forest. SO 763786. Acid brown soil over Kinlet Beds (Middle Coal Measures).

37 Birch scrub on quartzite, Ercall, near Wellington. SJ 643096. Podzol over Cambrian Quartzite.

38 Hybrid oakwood above main granophyre quarry on the Ercall, near Wellington. SJ 643097. Podzolized brown soils over acid granophyre.

39 Grassy hybrid oakwood on the Ercall, near Wellington. SJ 644095. Acid brown earth over rhyolite.

40 Sessile oakwood screen along Buttonoak-Bewdley Road, Wyre Forest. SO 761776. Acid brown soil over Coal Measures.

41 Oaks Wood, an open steeply sloping sessile oakwood near Pontesbury. SJ 415052. (*Hieracium* sp.2). Sandy loam over Longmyndian sediments.

42 Damp deciduous woodland on southern side of Seckley Ravine, Wyre Forest. SO 763786. Flushed brown soil over Kinlet Beds of the Productive Middle Coal Measures. (2 species of *Carex*, *Potentilla erecta* 1).

Stands 36 and 42 are both from the southern bank of the **Seckley Ravine, Wyre Forest.** Twenty per cent of stand 36, a characteristic heathy oakwood, is covered by bryophytes. Stand 42, which contains both heath and damp-loving species, is from a flush with a stream running through it immediately above a steep drop to the ravine. Drainage conditions and soil pH are very variable, the four indicators for Group 1 that are present (bracken, wavy hair-grass, creeping soft-grass and bilberry) occur in the drier parts of this extraordinary stand, the only member of Group 111.

BRYOPHYTES OF STAND 36
Seckley Ravine, Wyre Forest, Worcs
Bazzania trilobata, Dicranum majus, D. scoparium, Hypnum cupressiforme, Lepidozia reptans, Mnium hornum (va), *Tetraphis pellucida*

Stands of Group 10 are more species-rich and occur on rather less acid soils than those of the heathy Group 11. The distinction between Group 10 and the various sub-groups of Group 0 is nevertheless clear, though less extreme than that between Group 11 and the sub-groups of Group 0. Group 10 is itself quite diverse. Stand 29 is a floristically simple, bracken-dominated site beneath heavily thinned Scots pine on a well-drained, rather irregular surface with an acid brown soil. Stand 30, a fairly typical member of Group 10, is on a mound-like protrusion of the predominantly north-facing slope of **Benthall Edge**; it is quite possible that this site was disturbed many years ago.

BRYOPHYTES OF STAND 42
Calypogeia muellerana, Dicranum majus, Eurhynchium praelongum, Fissidens sp., *Hypnum cupressiforme, Lophocolea* sp., *Mnium hornum, Pellia epiphylla, Thuidium tamariscinum*

Although stand 31 is an unusually damp site for Group 10, it comes from an area of **Brook Coppice** away from more uniformly damp alderwood. The (5m)² stand includes within it portions of a mosaic determined largely by drainage conditions. Heath bedstraw, wavy hair-grass and hairy woodrush occur on the drier areas, with smooth-stalked sedge, wood horsetail and bugle where it is damper. Bilberry, marsh violet, rough meadow-grass, common spotted-orchid, soft rush and sweet-grass occur nearby in a field layer where conditions may vary sharply from metre to metre. Another drier, slightly more acid and less complex stand from a grazed and formerly coppiced area of Brook Coppice was also classified in Group 10.

STAND 31 (Brook Coppice)
Galium saxatile, Deschampsia flexuosa, Luzula pilosa
Carex laevigata, Equisetum sylvaticum, Ajuga reptans

ADJACENT SPECIES
Vaccinium myrtillus, Viola palustris, Poa trivialis, Dactylorhiza fuchsii, Juncus effusus, Glyceria plicata

Stand 32 (**Wyre Forest**) has a diverse flora dominated by creeping soft-grass beneath an incomplete canopy of oak and birch. Topography is irregular, ancient ruts causing some areas to be less well drained than others. Stand 33 (**Breidden**, Powys) also has an incomplete canopy, mainly of sycamore, but is on a much more acid soil. It is also at a much greater altitude, only 65m below Rodney's Pillar at the top of the hill. Stand 34 is a well established naturally seeded woodland with birch 15m high on an old pit mound. Oak and ash grow well on some parts of the mound and oak in particular appears to be assuming an increasing dominance as succession proceeds. Such seral woodlands were much more common before large-scale landscaping by Telford Development Corporation; on more acid mounds wavy hair-grass often grew profusely. Wavy hair-grass (ecologically a calcifuge or calcium hating plant) also dominates the field layer of stand 35 from **Poles Coppice**, a large upland sessile oakwood which, as its name implies, has been regularly coppiced.

BRYOPHYTES OF STAND 34
(Muxton Bridge, Telford)
Atrichum undulatum, Eurhynchium praelongum, Mnium hornum

Of the species which indicate the left side of the first division, yellow archangel and Herb Robert occur only in stands classified in Group 0, dog's mercury and stinging nettle are present in only one stand each of Group 1, and the chances of finding male fern in a Group 0 stand are many times greater than in one allocated to Group 1. Although the chances of finding species such as bramble and wood-sorrel in a Group 0 stand are similarly greater than those of finding them in a Group 1 stand, they are preferential rather than indicator species.

Lamiastrum galeobdolon ssp. *montanum, Geranium robertianum, Mercurialis perennis, Urtica dioica, Dryopteris filix-mas*

Rubus fruticosus agg., *Oxalis acetosella*

As sub-division of most groups of stands is continued it is less common to find really clear-cut indicators. For example, although broad buckler fern and yellow archangel are much more common in stands belonging to Group 00, for which the computer programme has selected them as indicators, they are not infrequent in group 01. Though Group 000 contains only four stands these are themselves very diverse, despite possessing a number of species in common. Stand 4, like stand 1 (downy birchwood), has developed over glacial till at **Sweat Mere**, but this fen carr has many more species, including several **helophytes** (marsh plants), and much less acid soil than any other in the sub-group. Soil water relations in such areas often show strong seasonal variation. When visited in early May 1980 the level of water in the main drainage ditch just west of stand 1 was no more than 60cm below the top of the peat. Nevertheless, the surface soil can appear very dry by mid-summer. The canopy of the other two stands is

Dryopteris dilatata, Lamiastrum galeobdolon

STAND 4. Sweat Mere, fen carr helophytes (marsh plants)
Caltha palustris, Iris pseudacorus, Lycopus europaeus, Lythrum salicaria

provided by sycamore, stand 2 being a replanted area of **Fron Wood** and stand 3 a dry region on **Lawrence's Hill**.

The stands of Group 0010 with their colourful aspect societies (see Packham and Harding 1982) whose appearance changes so vividly as spring gives way to summer, correspond rather closely with what many would think a good deciduous woodland should provide by way of scenic beauty. Of the indicators for this division creeping soft-grass occurs in five stands, wood millet (a large erect tufted grass) in six, wood-sorrel in ten, and yellow archangel in all eleven stands. Bluebell with nine occurrences is strongly preferential.

GROUP 0010 INDICATORS
Holcus mollis, Milium effusum, Oxalis acetosella, Lamiastrum galeobdolon

Hyacinthoides non-scripta

The lowest species density of any stand in Group 0010 is 8 (ancient coppice with much dead wych elm on Cambrian sandstones and siltstones near the **Ercall** SJ 645095), but several other species grow close by. The most species rich is stand 6, which is in a streamside alderwood on alluvium and has 27 species of vascular plants and 9 of bryophytes. The additional nine herbs listed below grew under similar conditions in the area immediately adjacent to the stand.

Bryophytes of Stand 6: Streamside alderwood near the Ercall.
Brachythecium rivulare, B. rutabulum, Eurhynchium praelongum, Lophocolea sp., *L. heterophylla, Mnium hornum, M. undulatum, Pellia epiphylla, Plagiothecium denticulatum* complex

Adjacent species
Angelica sylvestris, Chrysosplenium oppositifolium, Filipendula ulmaria, Geum urbanum, Glechoma hederacea, Heracleum sphondylium, Stachys sylvatica, Urtica dioica, Viola riviniana

Hampton Beach is a dingle wood on the eastern slopes of the Long Mountain and is notable for the presence of *Astrantia major*, together with species indicative of ancient woodlands, such as Herb Paris. Three stands were observed in this wood and all were classified in Group 0010, although only stand 7 is shown in Table 7.3. This was a rather atypical, fairly flat alluvial area close to the stream, with young oak, hazel and hawthorn, which was probably much more open than formerly. Conditions in much of the wood are humid and the moss *Hookeria lucens*, which tends to grow in unpolluted areas, is abundant in places. A stand on the very steep stream bank contained hart's-tongue fern, hard shield-fern, and opposite-leaved golden saxifrage – all species characteristic of dingle woods.

Paris quadrifolia

Phyllitis scolopendrium, Polystichum aculeatum, Chrysosplenium oppositifolium

Stand 10 (**Loamhole Dingle, Ironbridge**) is remarkable for the magnificence of its sweet woodruff. In common dog-violet and tufted hair-grass this stand possessed two of the indicators for Group 0011 (the other is wood sedge). This is the largest of the groups adopted and is on soils of markedly higher pH than those of Group 0010, though its species richness is similar. Several of its stands are on clay soils and those in **Weir Coppice** (stand 17) and at **Limekiln Hill** (stand 11) are very damp. **Badger Dingle**, near Worfield (stand 13) is a woodland largely derived from a Victorian 'wild garden' which boasts many introductions including royal fern, ostrich fern and box. The canopy above this gorge in soft sandstone now consists mainly of sycamore though yew is present; the wood is also notable for small teasel.

Galium odoratum

GROUP 0011 INDICATORS
Viola riviniana, Deschampsia cespitosa, Carex sylvatica

Osmunda regalis, Matteucia struthiopteris, Buxus sempervirens, Dipsacus pilosus

Of the seven indicators used in dividing Group 0 only germander speedwell is restricted to the sub-group which it indicates; with the other six it is again a question of balance. Group 01 is more species rich than any of the other groups and has, on average, the least acid soils. With more samples it would merit further subdivision. The stands it contains show a wide range of soil pH from 4.3 (23, Norway spruce plantation, **Wyre Forest**) and 4.4 (24, well spaced mature beechwood at **Haughmond Hill**) to the markedly alkaline soils of stands 25, 26 and 27 which are derived respectively from Wenlock Limestone, Carboniferous Limestone scree and a shallow layer of till resting on Carboniferous Limestone. It is interesting to note that the next subdivision made by the programme put stands 18–23, together with another from **Stevens Hill** (SJ 557034), in Group 010 and stands 24–28 in Group 011.

Veronica chamaedrys

The latter five stands are of exceptional interest with a strong visual contrast between the mixed scrubby woodland adjoining the cliff edge at **Blodwel Rock**, where many trees have recently been coppiced and horses occasionally graze, and the woodland with an almost closed canopy on the Carboniferous Limestone scree below the cliff (stand 26). Amongst the species listed for the Blodwel stands old man's beard (otherwise known as traveller's joy), wild strawberry, burnet-saxifrage, salad burnet and sanicle are noted calcicoles, as are the mosses *Ctenidium molluscum*, *Eurhynchium striatum* and *Neckera crispa*. *Acrocladium cuspidatum*, found elsewhere in very damp habitats, occurs here on calcareous scree. The additional species listed below came from within a few metres of the stands. Bryophyte records are for the stands only.

CALCICOLES
Clematis vitalba, Fragaria vesca, Pimpinella saxifraga, Sanguisorba minor, Sanicula europaea

Blodwel Scrub (stand 27)
Brachythecium rutabulum, Ctenidium molluscum, Eurhynchium praelongum, E. striatum, Hypnum cupressiforme, Mnium longirostrum, M. undulatum, Neckera crispa, Pseudoscleropodium purum, Rhytidiadelphus squarrosus, Tortella tortuosa

Adjacent species
Anemone nemorosa, Arum maculatum, Aquilegia vulgaris, Cardamine hirsuta, Dactylorhiza fuchsii, Daphne laureola, Dryopteris filix-mas, Prunella vulgaris, Ranunculus auricomus, Sanicula europaea, Senecio jacobaea, Tamus communis, Trifolium dubium, Urtica dioica, Veronica arvensis

Blodwel Scree (stand 26)
Acrocladium cuspidatum, Bryum capillare, Ctenidium molluscum, Dicranum scoparium, Eurhynchium praelongum, E. striatum, Fissidens adianthoides, Hypnum cupressiforme, Lophocolea sp., *Mnium hornum, M. undulatum, Plagiochila asplenioides, Plagiothecium denticulatum* complex, *Thamnium alopecurum, Thuidium tamariscinum, Tortella tortuosa*

Adjacent species
Dryopteris filix-mas, Polypodium vulgare, Agrostis capillaris, Anthoxanthum odoratum, Arrhenatherum elatius, Bromus ramosus, Carex sylvatica, Epipactis helleborine, Geranium robertianum, Hieracium sp., *Poa trivialis, Rubus fruticosus, Tamus communis*

Much of the woodland at **Haughmond Hill** has been destroyed by fire. The area sampled (stand 24) forms a tongue of planted beech, with some *Quercus robur* and *Tilia* × *europaea*, running between arable fields at the base of the west-facing slope. Though the soil pH is relatively low the herb flora indicates an adequate supply of bases. The plants present in the scrubby woodland on Wenlock Edge (stand 25) betray the secondary nature of this woodland, which still contains some of the species which colonised the area when the limestone quarry was first abandoned. Stand 28 is from an area of open beechwood high above the River Severn at **Bridgnorth**. It is remarkable not only for the presence of the wild liquorice (*Astragalus glycyphyllos*), but for the unusual assemblage of species growing on a soil of high pH which consists largely of sand.

Drainage is good in all the five stands described above, whereas the stands in Group 010 tend to be damper. In most woodlands the field layer changes, sometimes quite markedly, from place to place as in **Eyemore Wood**, Worcs, which forms an extension of the Wyre Forest on the east bank of the Severn. Much of Eyemore Wood has been replanted but its field layer appears undisturbed in places. Two stands were taken from a region of the wood notable for frequent small-leaved lime and a large population of wood fescue. Stand 19 is on damp alluvium with a high organic content by a stream margin. This is a fairly typical habitat for thin-spiked wood-sedge, quite different from the drier sites favoured by the wood-sedge. The presence of opposite-leaved golden-saxifrage and stinging nettle is indicative of high NP (nitrogen and phosphorus) status and the plants found in this stand, including the bryophytes, occur frequently in moist woods. Pendulous sedge, ramsons (wild garlic) and garlic mustard are found nearby. A nearby stand, used in the indicator species analysis but not shown in Table 7.3, was allocated to Group 0010 along with another from a similar rocky dingle at **Hampton Beech** (SJ302052) rather than to Group 010 as was stand 19.

Tilia cordata, Festuca altissima

Carex strigosa

C. sylvatica

Chrysosplenium oppositifolium, Urtica dioica, Atrichum undulatum, Eurhynchium praelongum, Mnium hornum, M. undulatum

Carex pendula, Allium ursinum, Alliaria petiolata

Weir Coppice is a wood on the Coal Measures whose flora indicates a soil quite rich in bases. Stand 20 (Group 01), which has in its immediate vicinity many interesting species, is in a gravelly area in the upper slopes of the wood whose canopy now consists mainly of ash, though many dead or dying wych elms remain. Soil pH is high and the presence of cleavers and stinging nettle indicates good NP status. Drainage water from the upper slopes of the wood flows into an area of dense alder and willow wood exemplified by stand 17 (Group 0011).

Stands 21 and 22 are both on brown earths developed over clay. Though the mean soil pH of the boulder clay site near the **Ercall** (5.1) is less than that developed over the Wenlock Shales at **Tick Wood** (6.1), both have lime-loving species (sanicle, *Eurhynchium striatum*) and a conspicuous growth of bramble.

STAND 20 (Weir Coppice)
ADJACENT SPECIES
Polystichum setiferum, Silene dioica, Stellaria holostea, Crataegus monogyna, Ilex aquifolium

BRYOPHYTES OF STAND 21
Tick Wood
Atrichum undulatum, Eurhynchium praelongum, E. striatum, Fissidens sp., *Mnium hornum, M. undulatum, Pellia epiphylla, Plagiochila asplenioides, Plagiothecium denticulatum* complex

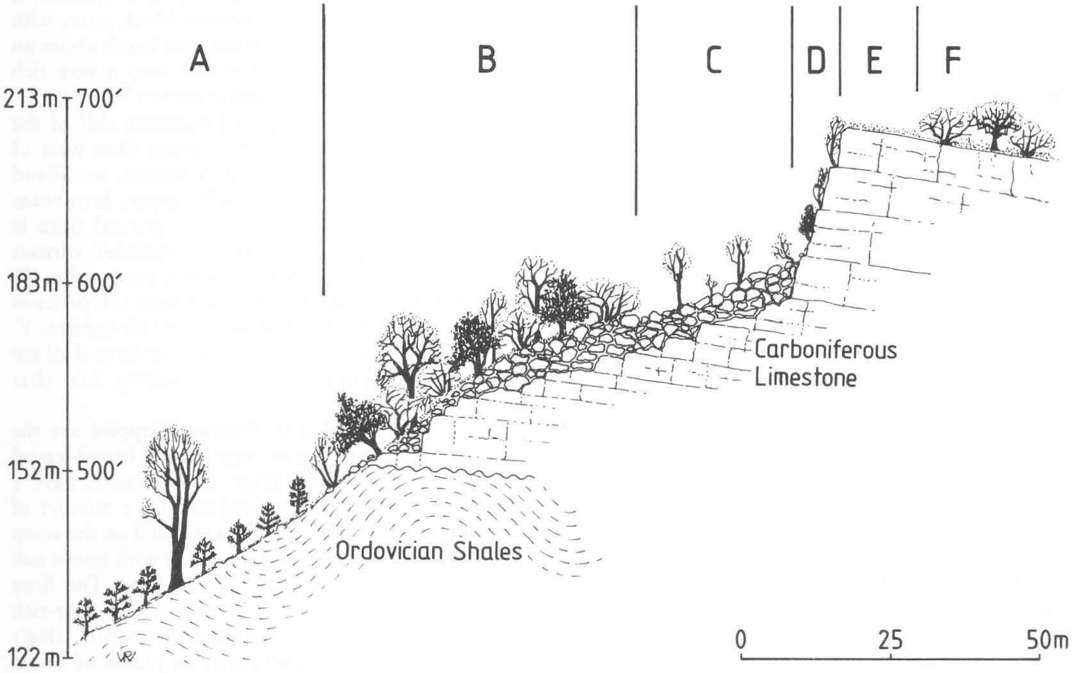


Figure 7.4 *WNW–ESE section through Blodwel Wood and Rock, SJ 266232–268232, showing geology and vegetation zones. A: cleared and replanted woodland with young conifers and relict standards of* Tilia cordata *on stony clay; B: mixed* Fraxinus, Ulmus glabra *and* Betula pendula *with dense understorey of* Corylus avellana *and* Taxus baccata *on limestone outcrops and rubbly scree; C: scattered* Fraxinus *and moss-patches on block-scree; D: limestone cliff with* Taxus, Sorbus anglica *and other trees rooted in crevices; E: short turf with calcicolous orchids on shallow calcareous clay; F: open scrub woodland of* Crataegus monogyna, Corylus *and* Betula, *glades with* Aquilegia vulgaris, Orchis mascula *and* Primula veris. Trollius europaeus *occurs on similar but deeper soil further back from the cliff edge.*

7.8 Further comments on woodlands of particular interest

Amongst the most interesting woods in the region are those dominated by sessile oak (*Quercus petraea*); some woods of this type have already been discussed in section 7.7 while the **Hope Valley** reserve is mentioned in 3.5. **Clunton Coppice** is an example of the steeply sloping acidic sessile oak woods of south-west Shropshire. This 60 acre (25ha) wood is dominated by sessile oak with scattered birch and local hazel. Other tree species present are holly and rowan. The majority of trees are derived from coppiced stumps. The ground flora is characteristically poor in species, consisting mainly of wavy hair-grass, creeping soft-grass, great woodrush, bilberry, heather, hard fern, common cow wheat and bracken. Notable is the oak fern (*Gymnocarpium dryopteris*).

Oaks Wood, Habberley Valley, is similar to the above but very poor in flowering plants and exceptionally rich in mosses, liverworts and lichens, with many similar to those in some Welsh oak woods, e.g. *Bazzania trilobata* and *Lepidozia reptans*. On the conglomerate rocks at the top of the slope is found the moss *Andreaea rupestris*, normally confined to much higher altitudes. Some fragments of interesting mixed woodland are also found in the Habberley Valley, part of which is within the **Earls Hill Nature Reserve**. Ash, wych elm and large-leaved lime are the principal trees, with alder along the stream sides where alternate-leaved golden saxifrage and intermediate enchanter's nightshade (*Circaea × intermedia*) are notable records.

Resting Hill is an example of one of the many upland sessile oak woods which have been grazed by sheep to the extent that the original ground flora has almost entirely disappeared and the regeneration of trees and shrubs has been prevented. The wood is almost pure coppice oak with a few birch and rowan. Ground flora is very poor and dominated by grasses and moss. However, this is possibly the only site in Shropshire for the upland wood ant (*Formica lugubris*). The wood is now part of the **Stiperstones National Nature Reserve** and it is hoped that careful management will encourage regeneration of woodland plants.

Sessile oak grows well in the drier acres of the **Wyre Forest**, which has a total area of about 2430ha (6000 acres) and is one of the major surviving areas of ancient semi-natural broad-leaved woodland in Britain. It is of national importance and about 250 hectares of the forest are a National Nature Reserve; most of this area is in Worcestershire. The forest lies almost entirely on soils derived from the sandstones and clays of the Coal Measures. Much of the plateau woodland is dominated by sessile oak, formerly coppiced with birch and rowan as associated species. The plateau is cut through by a series of streams including that in the **Seckley Ravine**, whose ecology is described by Packham and Willis (1976), and the much wider Dowles Brook a little further south. In these valleys, which drain into the River Severn, pedunculate oak becomes more common together with a greater variety of other tree species, including ash, beech, yew, holly, small-leaved lime, sycamore and wild service tree. Alder is common on the alluvium of the valley floor and hybridisation between the two oaks is extensive. There has also been considerable planting of conifers (see 3.5). A popular account of the Wyre Forest is given by Hicken (1971), while the bryophytes are described by Greene and Clark (1962) and by Hawksworth and Rose (1969), the latter authors considering the lichens also.

The ground floras of the valley and the plateaux differ also. Whereas the plateaux are dominated by heather, bilberry and bracken, the valley woodlands possess a more diverse range of habitats, varying from moderately acidic flush mire with bog moss and purple moor-grass to base-rich communities with dog's mercury and false brome dominating. Within this range of habitats many rare and interesting species occur, including soft-leaved sedge (*Carex montana*), mountain melick, sword-leaved helleborine (*Cephalanthera longifolia*), lily-of-the-valley, wood cranesbill and columbine. Pendulous sedge is conspicuous in some areas.

Cuckoopen Coppice is fairly typical of the oak woods on the heavy red-clay soils of the Clee Hills platform. Although the pedunculate oak is the most common tree, sessile oak also occurs in these woods. Local variations in soil moisture may encourage a greater frequency of ash or alder. The ground flora is typically diverse and luxuriant with dog's mercury and yellow archangel being common. Less common plants include nettle-leaved bellflower, moschatel, thin-spiked wood sedge (*Carex strigosa*) and Herb Paris.

Woodlands on limestone are usually of exceptional interest. **Blodwel Wood** is a dry limestone wood which, in spite of some clear felling and under-planting, still deserves its status as a Site of Special Scientific Interest (SSSI). It is an outstanding example of a mixed woodland on limestone block scree, with small-leaved lime, ash, wych elm and beech above an understorey of yew and hazel and with a very rich moss flora which is mentioned in section 7.7.

Beneath the Carboniferous Limestone cliff of the **Craig Sychtyn** Nature Reserve, about 6km west of Llynclys, is an ancient mixed deciduous woodland with oak, ash, sycamore, spindle, aspen, hornbeam and wild service tree. Though the ground flora is dominated by dog's mercury, it includes various orchids, hart's-tongue fern, cowslip, false oxlip (*P. veris × vulgaris*), slender St John's-wort (*Hypericum pulchrum*) and three species of violet (*Viola hirta, V. reichenbachiana, V. riviniana*). Most striking of all are the extensive communities of stinking iris (*Iris foetidissima*).

Wolverton Wood and **Alcaston Coppice** are the largest remaining areas of semi-natural broad-leaved woodland on Wenlock Edge. These woods have a varied structure and flora and contain a number of woodland types. Much of the woodland on the scarp is characterised by ash and wych elm with sessile oak and locally abundant small-leaved lime. The flora consists partly of species characteristic of base-rich soils such as yellow archangel, woodruff, dog's mercury and sanicle, and partly of plants of acidic conditions, for example, great woodrush and creeping soft-grass. Several uncommon plant species have been recorded. These include wild service tree, lily-of-the-valley, Herb Paris and broad-leaved helleborine (*Epipactis helleborine*). The adjacent **Edge Wood** is managed as an STNC Nature Reserve.

Tick Wood and **Benthall Edge** are parts of an extensive area of woodland overlying a variety of rock types. The more base-rich soils on the Silurian limestone and shales support a mixed woodland which can be sub-divided into three main types: ash-hazel, ash-wych elm and ash-small-leaved lime. Tick Wood also has an area dominated by wild cherry (*Prunus avium*). The ground flora contains plants which are characteristic of base-rich soils such as ramsons, sanicle, woodruff and dog's mercury. Uncommon plant species include fingered sedge (*Carex digitata*), in its only known Shropshire locality, wood barley, toothwort (*Lathraea squamaria*), violet helleborine (*Epipactis purpurata*) and wild service tree.

Downton Gorge, Herefordshire, is a wooded limestone gorge which has been cut by the Teme in rocks of the Ludlow Series (Silurian). Much of the woodland has been re-afforested with conifers, but the steeper slopes of the gorge retain semi-natural broadleaved woodland in which large-leaved lime is unusually abundant, and the site is an SSSI. The herbaceous flora includes a number of uncommon plants such as wood fescue (*Festuca altissima*), whilst further rare species are included in the rich lichen and moss communities of the trees and rock faces.

Deeply incised wooded valleys such as that at **Lydebrook Dingle** are not uncommon in Shropshire. This particular narrow steep-sided wooded dingle is on Coal Measures and basalt. The woodland consists of ash/wych elm, sessile oak and alder stand types. There are also rock face communities. Lime-rich springs along the valley side have caused the accumulation of considerable deposits of tufa, mainly in association with the moss *Cratoneuron commutatum*. Plants present include uncommon species such as wood barley (*Hordelymus europaeus*), wood horsetail and the moss *Hookeria lucens*. The woodland flora varies from that on the sandstone outcrops which is acidophilous, to that in the valley bottom which is characteristic of damper base-rich soils and includes enchanter's nightshade, tufted hair-grass, male fern and woodruff.

One of the largest remaining areas of alder woodland in the region is found in **Brook Coppice**. The water-logged conditions of the flat valley bottom are dominated chiefly by coppiced alder. In addition, ash is locally common with *Salix caprea* and *S. cinerea*; other interesting shrubs include bird-cherry (*Prunus padus*) and guelder rose. The marsh woodland flora includes wood horsetail, tutsan, meadowsweet, wild angelica, marsh marigold and several sedges, including the local smooth-stalked sedge (*Carex laevigata*).

7.9 Some exceptionally large trees

Reference has already (7.2) been made to the records of Gardner (1951) who made many measurements of notable Shropshire trees. Alan Mitchell, who wrote *A Field Guide to the Trees of Britain and North-West Europe* (1974), has kindly provided the following data concerning large trees, mostly conifers, found in the Shropshire region. Pride of place goes to the original West Felton yew, which was planted in 1776 and now has a height of 17m and a diameter of 118cm. The trunk diameters given below were measured at breast height (1.3m) unless there is a statement to the contrary.

Table 7.4 Heights and diameters of some recently measured trees in the Shropshire region

Leaton Knolls, 1981:			
Cedar of Lebanon	*Cedrus libani*	43m × 113cm	Tallest.
Crimean pine	*Pinus nigra* v *caramanica*	38m × 136cm	Superb bole of Crimean pine.
Coastal redwood	*Sequoia sempervirens* 1848	42m × 131cm	
		40m × 158cm	Among the oldest and tallest in the UK.
Eastern hemlock	*Tsuga canadensis*	32m × 89cm	
		31m × 98cm	Among tallest.
	Magnolia acuminata	21m × 80cm	Very big.
	Populus × 'Lloydii'	33m × 195cm	Original of a form of Black poplar named by Henry.
Powis Castle, nr Welshpool, Montgomeryshire, 1981:			
Silver fir	*Abies alba*	45m × 121cm	
Maidenhair tree	*Ginkgo biloba*	27m × 62cm	
Ponderosa pine	*Pinus ponderosa*	41m × 133cm	Originals from seed collected by Douglas. Tallest
		37m × 143cm	Biggest bole.
Douglas fir	*Pseudotsuga menziesii*	56m × 130cm	Once tallest tree, now bent-topped.
Big tree	*Sequoiadendron giganteum*	38m × 292cm	Biggest bole.
Sessile oak	*Quercus petraea* 'The Giant'	23m × 336cm	Biggest bole.
Leighton Park (Royal Forestry Society), near Welshpool:			
Leyland cypress	× *Cupressocyparis leylandii* 'Leighton Green' 1912 Estate. Park Wood	30m × 107cm	An original cross between the Monterey and Nootka cypresses.
Grand fir	*Abies grandis* 1886	58m × 115cm	Tallest tree in Wales.
Oakley Park, Ludlow, 1978:			
Caucasian fir	*Abies nordmanniana*	43m × 97cm	Tall.
Coastal redwood	*Sequoia sempervirens*	37m × 195cm	Big.
Sessile oak	*Quercus petraea*	27m × 226cm	Big.
Small leaved lime	*Tilia cordata*	35m × 155cm	Very big and tall.
Big tree	*Sequoiadendron* Avenue	Eleven trees; smallest × 216cm, biggest × 256cm (1977).	
	Populus nigra v *betulifolia*	32m × 178cm. (1971) 30.5m× 156cm in 1908.	
Monk Hopton, Bridgnorth 1971:			
Incense cedar	*Calocedrus decurrens*	27.5m × 154cm (at 0.3m)	
Deodar cedar	*Cedrus deodara*	28m × 131cm	

Table 7.5 The 56 woody species present in the 77 verge sites examined in the Shropshire region in 1975. Each site included both sides of a 100-metre stretch of road. Species included in any hedges present were recorded; the number of sites in which each was found is shown. (Derived from Sinker, Packham and Trueman 1979).

Acer campestre (Field maple)	39
A. pseudoplatanus (Sycamore)	25
Aesculus hippocastanum (Horse chestnut)	3
Alnus glutinosa (Alder)	7
Betula pendula (Silver birch)	5
B. pubescens (Downy birch)	2
Carpinus betulus (Hornbeam)	1
Cornus sanguinea (Dogwood)	17
Corylus avellana (Hazel)	64
Crataegus monogyna (Hawthorn)	76
Euonymus europaeus (Spindle)	5
Fagus sylvatica (Beech)	4
Frangula alnus (Alder buckthorn)	1
Fraxinus excelsior (Ash)	52
Ilex aquifolium (Holly)	44
Ligustrum vulgare (Privet)	5
Lonicera nitida	1
Malus sylvestris (Crab apple)	12
Populus nigra (Black poplar)	1
Prunus avium (Wild cherry)	2
P. cerasifera (Cherry plum)	2
P. cerasus (Dwarf cherry)	1
P. domestica (Wild plum)	16
P. spinosa (Blackthorn)	61
Quercus cerris (Turkey oak)	1
Q. petraea (Sessile oak)	18
Q. petraea × *Q. robur*	1
Q. robur (Pedunculate oak)	28
Rhamnus catharticus (Buckthorn)	1
Ribes nigrum (Black currant)	1
R. sylvestre (Red currant)	1
R. uva-crispa (Gooseberry)	7
*Rosa**	10
R. arvensis (Field rose)	36
R. canina (Dog rose)	43
R. rubiginosa (Sweet briar)	4
R. rugosa (Japanese rose)	2
Rubus caesius (Dewberry)	5
*R. fruticosus** (Bramble)	62
R. idaeus (Raspberry)	13
R. myriacanthus	2
Salix aurita (Eared willow)	1
S. caprea (Goat willow)	5
S. cinerea (Grey willow)	5
S. fragilis (Crack willow)	5
S. viminalis (Osier)	2
Sambucus nigra (Elder)	54
Sorbus aucuparia (Rowan)	9
S. torminalis (Wild service tree)	1
Symphoricarpos rivularis (Snowberry)	1
Syringa vulgaris (Lilac)	3
Tilia × *vulgaris* (Common lime)	1
Ulex europaeus (Gorse)	4
Ulmus glabra (Wych elm)	15
U. procera (English elm)	15
Viburnum opulus (Guelder rose)	5

* aggregate

7.10 Hedgerows

In the east Midlands the system of dating hedges used by Hooper (1970) seems to work fairly satisfactorily. The theory assumes that a single-species hedge is planted and then acquires extra species by colonisation (Pollard, Hooper and Moore, 1974). The formula : number of shrub species per 30-yard length × 100 = age of hedge in years is employed to give an approximate age to a hedge for which there is no documentary evidence.

In Shropshire, however, Cameron and Pannett (1980) have shown that diversity of hedgerow species is only weakly related to age and is, moreover, influenced by the mode of origin of the hedge. In lowland areas, old lane hedges and those from **assarted woodland** (woodland included in early piecemeal enclosures) are richest, containing woodland species rare elsewhere. Hedgerows from regular enclosures are poorer, but those on what was formerly common pasture are richer than those on areas which were previously open fields. A similar pattern occurs in the uplands, though here diversity is usually greater owing to the presence of upland species with good colonising powers.

The Shropshire Flora verge survey made in 1975 provided information concerning the composition of 77 hedges forming a stratified random sample of the Shropshire region (Sinker, Packham and Trueman 1979). In each case the species present on both sides of a 100-metre stretch of road, including those in hedges where present, were to be recorded. The woody species present are shown in Table 7.5, which includes many shrubs and trees common in hedgerows and scrub, the most frequent being hawthorn (*Crataegus monogyna*) which was present in 76 out of the 77 sites. Hazel was present in 64, blackthorn in 61, elder in 54, common ash in 52 and holly, whose foliage was formerly fed to cattle, in 44. The wide occurrence of holly in Shropshire is partly explained also by the frequent use of this shallow-rooted and conspicuous tree as a marker for the outfalls of field drains.

The hedges and verges of the Shropshire Region are very rich in species compared with those of many other parts of the British Isles, sometimes providing refuges for interesting plants and animals in what is otherwise dull arable land.

7.11 Scrub

Scrub, unless it is managed either as a hedgerow or for some other purpose, is a transitional stage between grassland (or other low growing vegetation) and woodland. Its occurrence is often transitory and related to the date of abandonment of a field, quarry or railway track. In Shropshire, as in the rest of England, hawthorn is the commonest constituent of scrub (Tansley 1939, Packham and Harding 1982), often forming part of successions to oak or mixed deciduous woods. The scattered hawthorn bushes on the sides of the **Long Mynd** valleys appear to be limited in their range of ages, and may reflect a period of reduced grazing at a time of agricultural depression. A complete abandonment of pasture between the two world wars led to the growth of bracken and scrub in places such as the lower south-east flank of **Earls Hill Nature Reserve**, which is now dominated by a mixture of ash, wych elm, sycamore, hawthorn, briar and brambles. Its former status as pasture is confirmed both by maps and by the survival there of meadow saffron (*Colchicum autumnale*).

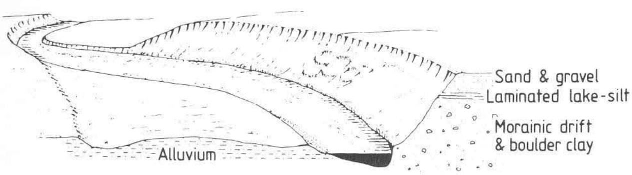
The neglected and undergrazed common at **Merrington Green** is notable for its richness in microspecies of *Rubus* (brambles) (A. Newton, pers. comm.); *Salix nigricans*, a rare northern willow, has also been found there recently. Disused green lanes and other sheltered sunny spots are often taken over by impenetrable thickets of blackthorn.

Disturbance and enrichment of the soil by animal activity favour the growth of elder, which often marks old badger setts and rabbit warrens: a remarkable grove of elder, more than one hectare in extent, covers a former landslip in the glacial drift of **Preston Rough**, an unstable river-cliff beside the Severn at Preston Montford. The banks of lowland rivers formerly provided useful sites for the cultivation of economically valuable willows used in basket-making: a roadside ditch at **Crew Green**, for example, still contains an osier bed with five species of *Salix* and three hybrids (*Salix fragilis, S. triandra, S. purpurea, S. viminalis, S. cinerea, S.* × *sericans, S.* × *smithiana, S.* × *multinervis*). Both above and below Shrewsbury a number of islands (eyots or 'bylets') in the River Severn, created by the construction of fish weirs and by-pass channels, are inaccessible to grazing stock and support a luxuriant scrub of osiers and elder on their fertile alluvial soil; though ash and alder are frequent, flooding has probably prevented the establishment of oak woodland.

Certain upland sites never reach the stage of continuous mature wood cover by virtue of limiting environmental factors such as drought or exposure. The hot dry conditions affecting the south slopes of Breidden Hill, for example, have produced a mosaic of stunted trees, scrub and open communities of drought-resistant plants.

Blodwel Rock is a small west-facing cliff of Carboniferous Limestone at Llanymynech Hill, a few miles north of Breidden, on which bushes and windswept trees have a precarious roothold; yew, whitebeam (*Sorbus anglica*), hazel and hawthorn are native there, but larch and even Scots pine have successfully seeded themselves on inaccessible ledges. The steep south-facing limestone slope above Nantmawr is occupied by **Jones's Rough**, a dense yew-hazel scrub whose origin is uncertain. The wood is now managed as a nature reserve by the STNC. A number of large limestone quarries in the same neighbourhood and also on Wenlock Edge, which were abandoned in the last half-century, have developed interesting grassland communities. Parts of these change in time into dense pockets of scrub dominated by ash, hawthorn, blackthorn, and occasional spindle and dogwood. In certain quarries traveller's joy can be found scrambling vigorously over other shrubs and trees.

Dumped mineral waste such as mine spoil, ballast, cinders and furnace slag, is often colonised by the wind-borne seeds of goat willow (*Salix caprea*), the most drought-tolerant of willows. Common sallow (*Salix cinerea*) may also be present, but is more typical of old claypits and dominating the early *carr* stage (with alder buckthorn) in the peatland succession (see chapter 5). Drier peat-mosses and heathland, swept by intermittent fires, are invaded by secondary birch scrub (see 7.5).



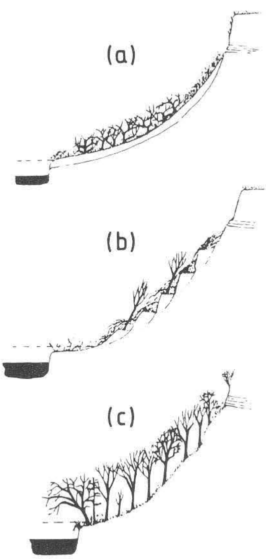
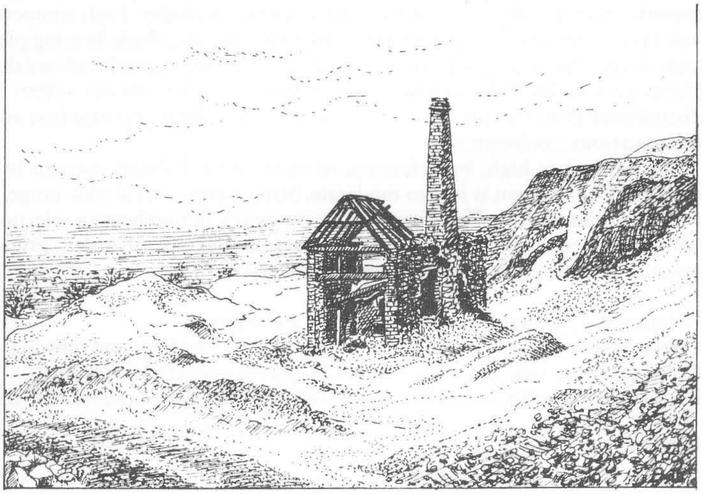


Figure 7.5 *Block diagram and W–E sections of Preston Rough (bank of River Severn at Preston Montford), SJ 433145, showing drift geology and vegetation. Horizontal broken line at foot of each section is winter flood-level. Undercutting by river steepens cliff, seepage of water from spring-line above laminated lake-silt layer lubricates loose material on slope below. Slope may collapse and its gradient be reduced (a) by mass slumping (section on right, with dense thicket of* Sambucus nigra*), or (b) by a series of stepped rotational landslips which cause young trees to tilt backwards and brambles to stretch like cables from terrace to terrace; or (c) it may be partly stabilized by roots of sycamore, ash and alder trees. (Block diagram based on a drawing by David Pannett.)*

8 Disturbed and ruderal habitats



8.1 A miscellany of weeds

RUDERAL plants are those which grow on ruins, rubble, rubbish tips, railways, roadsides and the runways of former airfields. In a landscape as long under human occupation as the region with which we are concerned, all habitats are more or less disturbed and none of the vegetation is more than semi-natural; the limits of the present chapter are therefore quite arbitrary. In some respects its scope is closely parallel to that of Chapter 6, where the paragraphs of 8.1 dealing with new grasslands and verges could equally well have been included. On the other hand unarguably man-made water bodies such as canals, ditches and field ponds, together with some wet grassy sites, were described in Chapter 5; and Chapter 7 dealt with hedges, scrub and 'woody weeds'.

This chapter, then, concentrates for the most part on dry, open habitats created or profoundly modified by human activity. Many of these are of recent origin, or are frequently re-disturbed. They are taken over by by opportunist **pioneer** species, whose efficiency as initial colonists is more significant than their ability to compete with other plants in closed vegetation. Annuals or biennials, such as groundsel or weld, with copious seed production and effective dispersal, play an important part in the early stages and on soil which is turned at least once every year. Invasive perennials like creeping bent, with its **stolons** or runners, and common couch and rosebay willowherb, with their underground **rhizomes**, move in and establish themselves on less-often disturbed sites. Alien intruders are generally more successful in ruderal habitats than they are at finding a vacant niche in 'natural' vegetation: American willowherb and Japanese knotweed both illustrate this point.

TYPICAL SPECIES
Senecio vulgaris, Reseda luteola

Agrostis stolonifera, Elymus repens, Chamerion angustifolium

Epilobium ciliatum, Reynoutria japonica

The pioneer vegetation of waste land on fertile soil is rather like a newly-developed holiday resort on the Mediterranean coast: its luxuriant growth and apparently high population density conceal a low degree of structural organisation. The communities are poorly integrated, and association, both positive and negative, is weak (see 8.2). Quite different groups of species can be found growing in similar places under almost identical environmental conditions. The choice depends on whose propagules arrived there first.

Plant ecologists have devoted much attention in recent decades to the various 'strategies for survival' – generally of the species rather than the individual – evolved by different plants under the pressure of natural selection (Harper 1977; but see also Harper 1982). Specific patterns of life history, reproductive capacities and methods are inherent in the genotype; so, too, are limitations to the **plasticity** of form or to the physiologically-controlled **relative growth rates** (RGR) which the individual or the species can achieve when environmental constraints are removed (Grime and Hunt 1975). Grime (1979) believes that the composition of a piece of vegetation is controlled by the interplay of three major

Ruined engine-house and barytes spoil-heaps at Snailbeach mine determinants, **competition**, **stress** and **disturbance**, which operate through the growth and reproductive strategies of the species available. High competition will favour densely-tufted perennials and taller, woody, shade-bearing plants; high stress (shortage of water or essential nutrients, for example) allows thrifty plants of low RGR to survive while their greedier neighbours suffer; high disturbance gives the advantage to set-seed-quick ruderal opportunists; and so on, in various combinations.

Disturbance is high, by definition, in most of the habitats covered in this chapter. Competition is low to moderate. Stress varies over a wide range, and can take many forms. The mixed but by no means comprehensive selection of sites described have been arranged in some semblance of order, primarily according to the kind of disturbance that created them:

Extraction – (habitat types 1 and 2) mines and quarries
Construction – (3 to 6) airfields, urban ground, old buildings and railways
Cultivation and cutting – (7 to 9) gardens, arable, grassland and verges
Redistribution – (10) waste land (road works, building sites and rubbish tips).

EXTRACTION

Pit-mounds associated with former **coal mines** are scattered through **Telford** New Town – though many more have been bulldozed into fresh landscapes – and occur on a limited scale in other parts of the lowland-upland fringe (e.g. Highley; Great Hanwood; Pontesford; Gobowen). They are heaps of waste Carboniferous **shale** brought up from the mine and dumped around or near the shaft, sometimes with a residue of impure coal, ironstone and other types of rock. This material is typically both impermeable and very acid: biological activity is low, and the development of a mature soil is retarded. Mounds known to be more than a century old may still carry no more than an impoverished selection of heathland species. Less extreme sites may show the development of a natural succession to birchwood and even young oak; some mounds have been planted up with 'ornamental' conifers; others have been more or less successfully converted to low-grade pasture by liming, fertilising and grazing them.

1 Mines
1a Coal-shale pit-mounds: *Calluna vulgaris, Deschampsia flexuosa, Ulex europaeus, Vaccinium myrtillus, V. vitis-idaea; Holcus mollis, Betula pendula, Quercus* spp

A site of outstanding ecological interest is the **opencast** coal and refractory **clay working** at Stoneyhill near Coalbrookdale. This is a very recent excavation, which closed down in the late 1960s. It is remarkable for the rapidity with which spontaneous colonisation has taken place and for the diversity and richness of its newly-acquired flora, although parts of the site are still a clay desert. Most of the spoil is acid – pH3.1 has been recorded locally – but a thin skin of microflora and humus is forming, with conspicuous patches of lichens (*Cladonia* species, see 8.2 stand 6); mosses include *Rhacomitrium lanuginosum*. Common bent is abundant, with cat's-ear and a compact growth-form of heath milkwort. In one limited area, three species of clubmoss – very rare in the west Midlands – have become established, though how they got there so quickly is a mystery. Nearby on the same site a flattish area of base-rich clay (pH5.8) has a flora resembling a damp limestone meadow, with daisy, yellow-wort, glaucous sedge, common centaury, common spotted-orchid, red fescue, oxeye daisy, common bird's-foot-trefoil, cowslip and red clover. Much could be learned at Stoneyhill about the problems of revegetating mine-spoil and other waste at low cost.

1b Opencast clay spoil: *Agrostis capillaris, Hypochoeris radicata, Polygala serpyllifolia; Diphasiastrum alpinum, Huperzia selago, Lycopodium clavatum; Bellis perennis, Blackstonia perfoliata, Carex flacca, Centaurium erythraea, Dactylorhiza fuchsii, Festuca rubra, Leucanthemum vulgare, Lotus corniculatus, Primula veris, Trifolium pratense*

Quite different from the mounds of coal-shale and clay are the less common heaps of **slag and cinders** from the blast-furnaces of the iron industry in the 18th and 19th centuries. These materials are rich in bases, and in spite of sharp drainage and the risk of drought, give rise to fairly fertile soils, so that the mounds soon become covered with scrub in which birch is mixed with goat-willow.

Salix caprea

Goat willow is also common on some of the **spoil-heaps** from former **lead mines.** Ores of lead, zinc and copper were mined in the West Shropshire Hills and on Llanymynech Hill from Roman times until the first half of the present century, and an associated mineral, barytes, was worked at Cothercott until the end of the Second World War. The lead mines were driven into the rocks west of the **Stiperstones** ridge and along the **Hope Valley**, producing large volumes of waste rock debris and finer spoil, in which calcite is the commonest mineral, together with varying quantities of the ores themselves. The calcite spoil forms local patches of highly calcareous ground in otherwise lime-deficient parts of the landscape. Long-abandoned spoil heaps, such as those at **Pennerley**, are still only patchily colonised by plants which include such calcicolous annuals as thyme-leaved sandwort, hairy bitter-cress and fairy flax.

It is not always easy to tell whether these communities of small species remain open and stunted because of drought, an imbalance of nutrients, or the toxic effects of zinc and other heavy metals present in more than minute traces. There is certainly an impression of 'frozen disturbance' on the older spoil mounds, where most of the plant species are clearly **stress-tolerators** rather than ruderals: common mouse-ear, harebell, mouse-ear hawkweed, common bird's-foot-trefoil, ribwort plantain and common sorrel are associated with red fescue and common bent; all of these are plants of poor hill pastures on soils deficient in phosphate and nitrate, but the mosses and lichens which grow with them in some abundance suggest that there is something unusual about the mine-spoil environment.

1c Lead-mine spoil-heaps: *Arenaria serpyllifolia, Cardamine hirsuta, Linum catharticum; Cerastium fontanum, Campanula rotundifolia, Hieracium pilosella, Lotus corniculatus, Plantago lanceolata, Rumex acetosa, Festuca rubra, Agrostis capillaris; Bryum pallens, Ceratodon purpureus, Cladonia* spp;

Moonwort is occasionally found in such communities and mountain pansy grows in the turf close to the spoil heaps: it is tempting to wonder whether the latter plant may have developed some of the heavy metal tolerance shown by its European cousin, *Viola calaminaria*.

Botrychium lunaria, Viola lutea

At another former lead mine site nearby, an interesting demonstration has recently been set up by J.A. Bayley. Specially sown experimental plots of common bent and two selected strains of red fescue, one of which is tolerant of heavy metals, are being treated with various fertilisers. This site is also distinctive in having a **polluted stream** running through the middle of the spoil area. The channel and low banks of the stream are always wet, so drought can be eliminated from the list of restricting factors. The luxuriant green of the stream-side vegetation is blotched in places with sickly yellow: a chlorosis probably due to toxic inhibition of root growth and a failure of the enzyme systems responsible for the assimilation of iron (see Gemmell 1977). It is not a case of major nutrient deficiency in the environment: the stream runs alongside a dump of fertile soil in which nutrient-demanding plants such as creeping buttercup and stinging nettle flourish normally. Nettles growing beside the stream itself are extremely stunted, however, and bear very small, yellow leaves; similar symptoms are shown by cuckooflower and Yorkshire-fog (the most abundant grass), while common sorrel and willowherb have small, dark-purple leaves. The toxic effects appear to be most marked on the moist banks of the stream rather than in the fast-flowing water itself, where two mosses and a mass of filamentous algae look normal and healthy.

1d Polluted stream-banks and spoil: *Agrostis capillaris* 'Goginan', *Festuca rubra* 'Merlin' and 'Dawson'; *Ranunculus repens, Urtica dioica, Cardamine pratensis, Holcus lanatus, Rumex acetosa, Epilobium* sp; *Bryum argenteum, B. pseudotriquetrum*

It is a puzzling feature of the West Shropshire lead mines that they lack any of the distinctive rare species found on similar sites in North Wales and the Pennines (Bradshaw *et al* 1965). It is worth mentioning, however, a peculiar form of red campion growing on the limestone spoil from **copper mines** on **Llanymynech Hill:** this plant, which is heavily grazed by sheep and rabbits, forms hemispherical cushions bearing almost stemless clusters of flowers. It retains little of this character in cultivation, but is one of the several examples of members of the Pink Family with local strains apparently adapted to heavy metal pollution.

1e Copper mines: *Silene dioica*

Small quarries are common in the hill country. Many of them no doubt served purely local purposes: the building of nearby cottages or the metalling of tracks. Old **quarries in acid rocks**, such as quartzite, sandstone or siltstone, are colonised by a heathy vegetation hardly distinguishable from that on the surrounding pastures or lane-side banks. The main indicators of past disturbance are early hair-grass, foxglove, broom, sheep's-bit and sheep's sorrel; heath milkwort and western gorse are also typical.

2 Quarries

2a Acid rocks: *Aira praecox, Digitalis purpurea, Cytisus scoparius, Jasione montana, Polygala serpyllifolia, Rumex acetosella, Ulex gallii*

Certain forms of dolerite, a basic igneous rock, are valued for their non-slip properties as a road surfacing material: they are extensively quarried, especially on the Criggion side of Breidden Hill. Former **quarries in dolerite** (and similar rock types of intermediate base status) carry a rich and interesting flora, in which the ruderals are represented by common whitlowgrass and dove's-foot crane's-bill; associated species are typical of the communities of warm rocky slopes, and may include maiden pink, lady's bedstraw, mouse-ear hawkweed, Smith's pepperwort, white stonecrop, rock stonecrop, wood sage and common gorse. Black spleenwort, wood meadow-grass and navelwort are frequent in crevices in the quarry face.

2b Dolerite: *Erophila verna, Geranium molle; Dianthus deltoides, Galium verum, Hieracium pilosella, Lepidium heterophyllum, Sedum album, S. forsteranum, Teucrium scorodonia, Ulex europaeus; Asplenium adiantum-nigrum, Poa nemoralis, Umbilicus rupestris*

Abandoned **limestone quarries** are a particular feature of the **Oswestry uplands** and the northern end of **Wenlock Edge**. They are of great importance botanically, because they provide a haven for many of the species of limestone grassland, scrub and woodland whose area has been drastically reduced by modern farming and forestry practices. Boulders on the quarry floor, and the lower, shaded faces, bear rich and varied communities of lichens, mosses and liverworts. The quarry floor itself is often lined with a thin layer of clay and shows evidence of impeded drainage, indicated by such characteristic species as yellow-wort, common centaury, and glaucous sedge. Typical ruderal species are wild carrot, fern-grass, viper's-bugloss, hawkweed oxtongue, flattened meadow-grass and wild mignonette; traveller's-joy is also more often seen scrambling over quarry floors and old lime kilns than in the truly wild state. Among the less common plants still to be found in limestone quarries in this region are basil thyme, pyramidal orchid, blue fleabane, dropwort, autumn gentian, stinking hellebore, yellow bird's-nest and bee orchid.

2c Limestone: *Cladonia rangiformis, Acrocladium cuspidatum* (wet), *Camptothecium lutescens, Frullania tamarisci, Grimmia apocarpa, Pseudoscleropodium purum, Rhytidiadelphus triquetrus; Blackstonia perfoliata, Centaurium erythraea, Carex flacca; Daucus carota, Desmazeria rigida, Echium vulgare, Picris hieracioides, Poa compressa, Reseda lutea; Clematis vitalba; Acinos arvensis, Anacamptis pyramidalis, Erigeron acer, Filipendula vulgaris, Gentianella amarella, Helleborus foetidus, Monotropa hypopitys, Ophrys apifera*

Sand and gravel pits occur mainly on the glacial deposits in the lowlands. With their light and freely drained but moderately fertile soils, they harbour species which have become less common in the arable fields of the late 20th century: scarlet pimpernel, sun spurge, fumitory, cut-leaved crane's-bill, field scabious, bird's-foot, field madder, corn spurrey and hop trefoil are examples. Common species of sandy places such as perforate St John's-wort, poppies, white campion, hairy tare, common vetch and squirreltail fescue are abundant in sandpits, and naturalised aliens include tree lupin and evening primrose.

2d Sand and gravel: *Anagallis arvensis, Euphorbia helioscopia, Fumaria officinalis, Geranium dissectum, Knautia arvensis, Ornithopus perpusillus, Sherardia arvensis, Spergula arvensis, Trifolium campestre; Hypericum perforatum, Papaver* spp, *Silene alba, Vicia hirsuta, V. sativa, Vulpia bromoides; Lupinus arboreus, Oenothera erythrosepala*

CONSTRUCTION

Flat, sandy tracts in the lowlands provided sites for several airfields constructed during the Second World War. Most of these, of course, are no longer used for military purposes, but hundreds of acres of land are still kept out of agricultural use by the broad strips of concrete which formed the runways and perimeter tracks. On **Whitchurch Heath** the **concrete runways** have been broken up to discourage unauthorised motor sports, and an interesting flora has developed among the rubble where the combination of calcareous cement, bricks, stones and acid sand allow some unlikely associates to grow together. The most remarkable record from this site is yellow bartsia, a plant normally found in damp grassy places near the west coast; it is said to be associated with concrete trackways at Braunton Burrows (A.J. Willis, pers comm).

3 Airfields
Broken-up runways on sandy heathland: *Aira caryophyllea, A.praecox, Filago minima, Linum catharticum, Ornithopus perpusillus, Sagina apetala; Centaurium erythraea, Calluna vulgaris, Erica cinerea, Hieracium umbellatum, Jasione montana, Leucanthemum vulgare, Reseda luteola, Teucrium scorodonia, Trifolium arvense, Verbascum thapsus; Parentucellia viscosa*

Concrete and other hard, artificial surfaces such as paving stones in **built-up areas** provided an exacting habitat for a few specialist plants. The moss *Bryum argenteum* grows in the angle between curbstone and gutter in many streets; the **joints between paving stones, cracks in old concrete** and drives surfaced with chippings or compacted gravel permit the germination of a few small but nutrient-demanding annuals such as thale cress, shepherd's-purse, swine-cress and pearlworts. Another urban microhabitat with a distinctive combination of features is the warm, sunny and sheltered strip at the **base of walls**, frequently enriched by the urine and faeces of dogs. Here, and on the grassy **verges of footpaths**, grows a community of plants which require both warmth and a copious supply of nutrients: they include black horehound, barren brome, wall barley, red dead-nettle, nipplewort, common mallow, annual mercury and hedge mustard.

4 Urban ground
4a Paving joints and cracked concrete: *Arabidopsis thaliana, Capsella bursa-pastoris, Coronopus squamatus, Sagina apetala, S.procumbens*

4b Base of walls and footpath verges: *Ballota nigra, Bromus sterilis, Hordeum murinum, Lamium purpureum, Lapsana communis, Malva sylvestris, Mercurialis annua, Sisymbrium officinale*

Old walls are an interesting plant environment, providing a surprising variety of microhabitats determined both by the nature and construction of the building material itself and by the great variation in water availability and microclimate. Pink and perennial wall-rocket have long been known on Ludlow Castle and on Haughmond and Shrewsbury Abbeys (Chapter 2). There are mosses which confine themselves to particular types of stone or brick or to mortar-courses, and ferns which are very selective about the width and orientation of the crevices they occupy: wall-rue, maidenhair spleenwort and rustyback are examples. Red valerian, wallflower, yellow corydalis and pellitory-of-the-wall all have their special requirements. The charming ivy-leaved toadflax holds its flowers facing the sun, but turns shyly away when ripening its fruit and buries its seed-capsules in the darkest crack available. Smooth meadow-grass and biting stonecrop are typical of weathered gaps in the coping along the tops of walls, where common whitlowgrass and wall speedwell are also found. Among the most interesting aliens in the wall flora are the butterfly-bush, from China, and the celebrated Oxford ragwort from the slopes of Mount Etna, which found its way from the Botanic Gardens of Oxford University, via the Great Western Railway and rival networks, to most parts of Britain.

5 Old buildings
5a Walls and mortar-courses: *Dianthus plumarius, Diplotaxis tenuifolia;*
Bryum capillare, Tortula muralis;
Asplenium ruta-muraria, A. trichomanes, Ceterach officinarum;
Centranthus ruber, Cheiranthus cheiri, Corydalis lutea, Parietaria judaica; Cymbalaria muralis;
Poa pratensis, Sedum acre, Erophila verna, Veronica arvensis; Buddleja davidii, Senecio squalidus

Even the **roofs of buildings** can support a community of plants, if a small and restricted one. The asbestos tiles covering a former pig-sty in a group of farm buildings at Preston Montford bear lichens similar to those growing on gull-roosts and perching rocks near the coast. Rainwater dripping from the overhanging branch of a lime tree helps to enrich this apparently inhospitable environment, and nourishes a succession which passes through the mossy stage to a few annual flowers and small grasses. Summer drought and the persistent attentions of a blackbird seeking for grubs destroy this fragile community each year, setting back the succession to an earlier stage.

5b Roofs: *Physcia* spp, *Xanthoria parietina; Orthotrichum diaphanum, Tortula ruralis; Cardamine hirsuta, Poa annua*

Ruined or demolished buildings are colonised by vegetation similar to that which grows on standing but weathered walls. The same is true of the **ballast**, usually limestone chippings or cinders, which forms the foundation for **railway tracks and sidings**. Typical colonists include several of the wall species listed above, together with rosebay willowherb, American willowherb, pale toadflax, weld, sticky groundsel and rat's-tail fescue. Perhaps the most specialised 'railway flower' is the small toadflax, which tends to grow along the central strip between the rails, directly under the line of travel of the toilet compartment in a passenger coach.

6 Railways
6a Tracks and sidings: *Chamerion angustifolium, Epilobium ciliatum, Linaria repens, Reseda luteola, Senecio viscosus, Vulpia myuros;*
Chaenorhinum minus

The grassy **embankments** and **cuttings** of railway lines also have their own distinctive flora. The soils vary widely in nutrient status and drainage, depending upon local geology or the construction of the permanent way, but they share in general the properties of not being grazed except by a small population of rabbits, and of suffering fairly frequently from accidental or deliberate burning. Under these conditions the dominant grass is usually false oat-grass. Associated plants may include field horsetail, black medick and such warmth-loving species as hoary cress, rare in this region, and field bindweed; where houses back on to the track, a number of garden plants may become naturalised: michaelmas daisy, garden lupin and Canadian goldenrod are typical.

6b Banks and cuttings:
Arrhenatherum elatius; Cardaria draba, Convolvulus arvensis, Equisetum arvense, Medicago lupulina;
Aster novi-belgii, Lupinus polyphyllus, Solidago canadensis

CULTIVATION AND CUTTING

The hedges and banks of **country lanes** are very different in character from railway cuttings, but they also support a mixed community which can include a number of **naturalised garden escapes**. These may be so long-established that there is no trace today of the cottage from whose garden they came.

Even if we ignore casual species of short duration, the list of **adventives** and **aliens** which can be found on lane-banks is very considerable. It includes greater celandine, leopard's-bane, dame's-violet, pink purslane, sweet cicely, green alkanet, yellow figwort, feverfew, tansy, vervain, periwinkle and various kinds of mint. Probably the commonest shrub to escape from cottage gardens into hedgerows is the Duke of Argyll's teaplant.

7 Gardens
7a Naturalised garden escapes: *Chelidonium majus, Doronicum pardalianches, Hesperis matronalis, Montia sibirica, Myrrhis odorata, Pentaglottis sempervirens, Scrophularia vernalis, Tanacetum parthenium, T. vulgare, Verbena officinalis, Vinca major, V. minor, Mentha* spp. and hybrids;
Lycium barbarum

Every gardener will have his or her own particular list of best-loved and most-hated weeds. The potential index is almost endless, as are the comments. **Garden weeds** range from humble mosses and liverworts on **trampled paths** and **bonfire sites**, via those which, like field wood-rush or Good-Friday-grass, indicate that a lawn has become too acid because of regular mowing and removal of the clippings without compensatory applications of lime and fertiliser, to the inevitable crop of ground-elder, petty spurge, black-bindweed, groundsel and couch on heavily-manured **vegetable beds** and **allotments**. The best-tended **lawns** have their daisies and, with luck, pale blue drifts of slender speedwell – known locally as 'everlasting sin' because it is so attractive and so prevalent; lesser and slender trefoils are also typical lawn weeds, the latter on sandy soils. Procumbent pearlwort and yellow oxalis grow among the mosses in flagstone-joints and flower-pots, while **borders and beds** are taken over by a variety of more or less welcome immigrants. Seed scattered in winter as birdfood can bring a harvest of strange plants such as false thorow-wax.

7b Gardens and allotments: *Barbula convoluta, B. unguiculata, Brachythecium rutabulum, Ceratodon purpureus, Funaria hygrometrica, Lunularia cruciata, Marchantia polymorpha; Rhytidiadelphus squarrosus, Luzula campestris; Aegopodium podagraria, Euphorbia peplus, Fallopia convolvulus, Senecio vulgaris, Elymus repens; Bellis perennis, Veronica filiformis, Trifolium dubium, T. micranthum; Sagina procumbens, Oxalis corniculata;*
Leucanthemum maximum, Euphorbia lathyrus; Bupleurum subovatum

A special environment where plant nutrients are not in limited supply is provided by compost and **manure heaps, middens**, old **stackyards** and neglected corners near farm buildings. Here, among the casual seedlings of cereals and other crops germinated from spilt grain, grow weed species whose high potential RGR enables them to indulge in rapid and luxuriant growth. They include barren brome, common orache, goosefoots including good-King-Henry, white dead-nettle, rough meadow-grass, creeping buttercup and – a most persistent pair – broad-leaved dock and common nettle.

7c Middens and farmyards: *Avena sativa, Hordeum vulgare, Triticum aestivum, Brassica* spp;
Bromus sterilis, Atriplex patula, Chenopodium spp, *Lamium album, Poa trivialis, Ranunculus repens, Rumex obtusifolius, Urtica dioica*

Farming is the major industry of the region, and **arable land** comes a close second to grassland in the proportion of the area it occupies. The revolution in agricultural technology (machines and chemicals) since the Second World War has made this vital industry enormously profitable, putting a premium on the efficient use of every square metre of land (Fryer and Chancellor 1970). Crops as close to pure monoculture as seed-cleaning and herbicides can make them are raised on soils of maximum fertility and uniformity. Never before have there been so few field weeds; but this purity may have reached its peak, as new, resistant strains evolve at a rate which we cannot indefinitely afford to match by developing new herbicides.

To weep at the passing of yesterday's **cornfield weeds** would seem ungrateful and sentimental. We have probably lost corncockle, Venus's-looking-glass, darnel, corn buttercup, shepherd's-needle and night-flowering catchfly; their modest charm lives on in their names. Scarlet pimpernel and blue cornflower, yellow-green spurges, pink fumitories and the saturated brilliance of poppies in the young green wheat are now uncommon sights. Together with wild radish, charlock and field penny-cress, they are more likely to appear on new road verges or rural building sites, where the disturbance of old field soil awakens long-dormant seeds.

8 Arable and bare soil
8a Lost and declining cornfield weeds: *Agrostemma githago, Legousia hybrida, Lolium temulentum, Ranunculus arvensis, Scandix pecten-veneris, Silene noctiflora;*
Anagallis arvensis, Centaurea cyanus, Euphorbia spp, *Fumaria* spp, *Papaver rhoeas; Raphanus raphanistrum, Sinapis arvensis, Thlaspi arvense*

Today's worst trouble-makers in cereal crops are a gang of **grasses**, some of them, including barren brome and the poas, fairly new to this particular game; black-grass is not a serious problem in this region. Other **weeds until recently resistant to spraying** are the mayweeds, the scented a more successful short-term opportunist than the slower-growing scentless; knotgrass, redshank and black-bindweed, three recalcitrant members of the Dock Family; and the notorious cleavers and common chickweed. Creeping thistle and perennial sowthistle, both rhizomatous, are a local menace on heavy soils.

8b Herbicide-resistant grasses and other weeds: *Bromus sterilis, Poa pratensis, P. trivialis, Agrostis gigantea, Avena fatua, Elymus repens; Alopecurus myosuroides; Matricaria recutita, Tripleurospermum inodorum, Polygonum aviculare, P. persicaria, Fallopia convolvulus, Galium aparine, Stellaria media; Cirsium arvense, Sonchus arvensis*

Even on comparatively neglected or less intensively managed land, modern practices affect the weed flora. Red bartsia, common field-speedwell and field pansy are typically associated with winter-sown wheat and barley, the latter two species often withstanding autumn-applied residual herbicides. Fool's parsley, fat-hen and other goosefoots, henbit dead-nettle, black nightshade, small nettle, field speedwells and, in warm summers, thorn-apple accompany sugar-beet and other **root and leaf crops** in fields and **market gardens**.

8c Weeds of restricted distribution: **(winter cereals)** *Odontites verna, Veronica persica, Viola arvensis;* **(root and leaf crops)** *Aethusa cynapium, Chenopodium album, C.*spp, *Lamium amplexicaule, Solanum nigrum, Urtica urens, Veronica agrestis, V.polita; Datura stramonium;*
(acid and light soils) *Chrysanthemum segetum; Anchusa arvensis, Aphanes arvensis, Scleranthus annuus, Spergula arvensis; Silene gallica;*
(damp and peaty soils) *Galeopsis speciosa; Mentha arvensis, Polygonum lapathifolium*

Soil properties are less important than they used to be in determining the composition of arable weed communities. Corn marigold is said to be favoured by acid soils: it has become rare with the universal practice of liming, though it can reappear briefly on newly-ploughed **headlands.** In the **unsprayed margins of fields** on light, dry, sandy or loamy soils, a distinctive group of species including bugloss, parsley-piert, annual knawel and corn spurrey can still be found. Once common in the cornfields on **Knockin Heath**, they are now largely confined there to disturbed road-verges, where the much rarer small-flowered catchfly has also survived.

The ecology and local distribution of the large-flowered hemp-nettle, a beautiful field-weed and ruderal, are something of a puzzle. It is now declining fast, even in the hill country, but is typically a plant of under-managed cereal crops on nutrient-rich but damp, often peaty, soils. Similar conditions seem to suit corn mint and pale persicaria, both of which are still locally abundant weeds.

Low-lying places in fields on heavy soils or peat often have shallow patches of **standing water in winter**, as do the **deeply-rutted tracks** where farm machinery or passing cattle have poached the ground. If the soil is acid and infertile, a characteristic group of species may be found colonising these wet places, including marsh cudweed, bristle club-rush, toad rush, trailing tormentil and bog stitchwort. On seasonally-wet but fertile lowland soils, and on mud dredged from ditches, grows a more luxuriant flora including the bur-marigolds, water-pepper, celery-leaved buttercup and golden dock. Very rare, in winter-flooded corners of arable fields, is mousetail, a curious small cousin of the buttercups.

8d Rutted tracks and wet mud: *Gnaphalium uliginosum, Isolepis setacea, Juncus bufonius, Potentilla anglica, Stellaria alsine;*
Bidens spp, *Polygonum hydropiper, Ranunculus sceleratus, Rumex maritimus;*
Myosurus minimus

One of the most widespread and distinctive vegetation types to be found in agricultural districts is the vigorous low-growing community which develops on fertile but **heavy-trampled ground. Field gateways**, tracks across pasture land, lane verges and **lay-bys** are typical sites. Annual and rough meadow-grasses and rye-grass flourish here, together with pineappleweed, greater plantain, knotgrass and silverweed. A variant of this habitat is the area where cattle stand under spreading trees to shelter from the sun: common chickweed is often the sole colonist of such places. Heavily trampled patches on dry, shallow, infertile soils, upland car parks and hill-tops with famous views, are sometimes colonised by an unexpected intruder from coastal habitats, the buck's-horn plantain – perhaps a 'tourist indicator'.

8e Field gateways and trampled ground: *Poa annua, P. trivialis, Lolium perenne, Matricaria matricarioides, Plantago major, Polygonum aviculare, Potentilla anserina;*
Stellaria media;

Plantago coronopus

Long-established and unimproved grasslands were dealt with in Chapter 6, but there is a place among the disturbed habitats for **temporary leys and recently re-seeded grassland**. Italian and perennial rye-grasses are the most important components in seed mixtures for temporary and permanent pastures respectively. Mixtures have changed much in recent years, but among the other grasses sometimes included have been slender soft-brome, cock's-foot, tall fescue, meadow fescue and timothy. The principal legumes in grass mixtures are white, red and alsike clovers. An occasional, but increasingly rare, survivor from former fodder crops is the delightful blue-flowered chicory. Perhaps the most beautiful weed of new or improved grassland, generally indicating the recent application of lime, is the musk thistle. Its less pleasant relatives, creeping and spear thistles, are persistent and almost ineradicable weeds of grassland, as is the curled dock.

9 Grasslands and verges
9a Leys, re-seeded pasture: *Lolium multiflorum, L. perenne, Bromus lepidus, Dactylis glomerata, Festuca arundinacea, F.pratensis, Phleum pratense;*
Trifolium repens, T.pratense, T.hybridum;
Cichorium intybus;
Carduus nutans, Cirsium arvense, C.vulgare, Rumex crispus

Roadside verges in areas of intensive farming are often hedgeless, and controlled by regular mowing and sometimes by the application of herbicides. Such **'well-managed' verges** bear a limited but distinctive flora dominated by nutrient-demanding grasses and umbellifers: creeping bent, meadow foxtail, false oat-grass, barren brome, cock's-foot, common couch and rough meadow-grass; cow parsley, hogweed, rough chervil and upright hedge-parsley, the last two usually in hedge-bottoms. Garlic mustard, cleavers, red dead-nettle, nipplewort and ivy-leaved speedwell are colonists of disturbed but very fertile roadside soils. Hedgerow crane's-bill and common toadflax tend to grow on the upper part of sunny banks, while creeping cinquefoil, creeping buttercup and several microspecies of dandelion occupy a strip adjacent to the road itself.

9b Well-managed verges: *Agrostis stolonifera, Alopecurus pratensis, Arrhenatherum elatius, Bromus sterilis, Dactylis glomerata, Elymus repens, Poa trivialis;*
Anthriscus sylvestris, Chaerophyllum temulentum, Heracleum sphondylium, Torilis japonica; Alliaria petiolata, Galium aparine, Lamium album, L.purpureum, Lapsana communis, Veronica hederifolia; Geranium pyrenaicum, Linaria vulgaris;
Potentilla reptans, Ranunculus repens, Taraxacum spp

Wilder **lane-sides and banks** in less intensively-farmed districts can be more interesting botanically: in the humid western uplands they are thick with ferns, but farther east they seldom escape the pervasive increase in soil fertility which has become a feature of the late-20th-century countryside. The best of them have affinities with open woodland or old grassland, carrying rich communities of herbaceous plants such as wood anemone, lords-and-ladies, wild strawberry, crosswort, hedge bedstraw, shining crane's-bill, herb Robert, wood avens, ground-ivy, bluebell, dog's mercury, wood-sorrel, barren strawberry, primrose, lesser celandine, red campion, greater stitchwort, germander speedwell, bush vetch and sweet violet. These flower-lined lanes, with their sustained splendour from early spring to the end of autumn, are a priceless legacy in the border landscape. We must not lightly let them go.

9c Old lane-banks: *Athyrium filix-femina, Dryopteris affinis, D. dilatata, D.filix-mas, Oreopteris limbosperma;*
Anemone nemorosa, Arum maculatum, Fragaria vesca, Galium cruciata, G.mollugo, Geranium lucidum, G.robertianum, Geum urbanum, Glechoma hederacea, Hyacinthoides non-scripta, Mercurialis perennis, Oxalis acetosella, Potentilla sterilis, Primula vulgaris, Ranunculus auricomus, R.ficaria, Silene dioica, Stellaria holostea, Veronica chamaedrys, Vicia sepium, Viola odorata

REDISTRIBUTION

The country lane-sides just described are subject to relatively little disturbance, apart from the occasional scrape where vehicles pass on a narrow bend, and local dumps of chippings and sweepings. Competition is therefore more intense than in most of the communities dealt with in this chapter. The principal forms of stress are mowing or flailing, salty spray from winter frost-grit on the road, and the cumulative effects of lead pollution from exhaust-gases (for a fuller treatment of this habitat and its ecology see Sinker *et al* 1979). **Road-widening**, the straightening of bends, regrading and other engineering works are much more likely to take place on major roads and on those bearing heavy local traffic. Such operations often involve cut-and-fill, the redistribution of very large volumes of subsoil, glacial drift and solid rock. Even when the topsoil has been carefully set aside and restored, its structure, drainage characteristics, erosibility and biological activity are profoundly modified by the traumas of removal, storage and replacement. During site clearance for **motorway** construction, "a swathe of countryside 200ft or so wide, 25 acres to the mile, is completely devastated, and all plant and animal communities relentlessly obliterated" (Dunball 1970).

When major road works are completed, an attempt is made to re-establish vegetation cover; the main components in standard mixtures are perennial rye-grass and white clover. Bare subsoil on the sides of cuttings or embankments is a hostile environment for the growth of these species, even when their seeds have been sprayed on by 'hydro-seeding' in a high-pressure slurry with fertilisers, chopped organic matter and water. The mixture tends to wash down and accumulate on the lower part of the bank, leaving an upper, humus-deficient zone where the 'take' is very patchy. This zone is often invaded by a limited selection of stress-tolerant weeds. In places where bare mineral soil (especially silt) is exposed, with impeded drainage and a winter-wet surface, the characteristic pioneer is colt's-foot. In more perennially wet places, such as stony drainage channels, butterbur may take over.

10 Waste land
10a Road works: *Lolium perenne, Trifolium repens*; (humus-deficient slopes) *Crepis capillaris, Holcus lanatus, Hypochoeris radicata, Plantago lanceolata, Trifolium dubium, Vicia sativa; Tussilago farfara; Petasites hybridus*

'Waste land' is a rather vague term for ground whose management is being neglected during a more or less protracted period of change of use. Its vegetation is almost impossible to characterise by lists of typical species. Much depends on which pioneers get there first, on the duration of the neglect and the frequency of disturbance. Other important factors include the presence or absence of topsoil and its fertility: new building sites on former farmland will obviously bear a very different flora of native ruderal weeds from the barren road-banks described above. Urban waste land, with its warmer microclimate, will favour thermophilous species. Disturbance may create new, artificial habitats which bring together ecologically-isolated but related species, enabling them to interbreed and produce hybrids. The importation and dumping, on **rubbish tips** and other **land-fill** sites, of 'foreign' materials such as cinders and blast-furnace slag, can provide a bridgehead for casual plants new to the area. Old and seldom-disturbed waste ground gradually develops a quasi-permanent community through the normal processes of succession, with dense tangles of tall herbaceous perennials, climbers and scrub. Even these late assemblages, however, have a high random component in their species composition, raising awkward questions about the nature of association between organisms, the predictability of ecological limits and the concept of the niche.

10b Building sites on fertile soil: *Aethusa cynapium, Atriplex patula, Carduus acanthoides, Conium maculatum, Equisetum arvense, Malva* spp, *Medicago lupulina, Sinapis alba, Sonchus asper, S.oleraceus, Tragopogon pratense; Bryonia dioica, Dipsacus fullonum, Lactuca serriola, Melilotus* spp;
Linaria purpurea × *repens, L. repens* × *vulgaris*
10c Rubbish tips, land-fill: *Aegopodium podagraria, Conyza canadensis, Foeniculum vulgare, Galanthus nivalis, Hyoscyamus niger, Nepeta cataria, Onopordum acanthium, Oenothera* spp, *Phalaris canariensis, Verbascum virgatum*
10d Old waste ground: *Arctium* spp, *Artemisia vulgaris, Calystegia sepium, Chamerion angustifolium, Reynoutria japonica, Rubus fruticosus* agg, *Rubus idaeus, Sambucus nigra, Solanum dulcamara, Tamus communis, Tanacetum vulgare*

Harper (1982) has reminded us of "the wide range of ecologically different behaviours that are included within single species". In our region individual plants of bittersweet, a taxonomically uncontentious species, can be found growing in reedswamp, the shallow margins of shady eutrophic ponds, ditch-banks, hedgerows, and in lime mortar on the crumbling top of an old brick garden wall more than two metres above the ground. Evidently we still have something to learn about the real ecology of this and other species.

Solanum dulcamara

8.2 Computer analysis of the quadrat data

The major habitat types recognised in section 8.1 are based on different kinds of disturbance, and within these are site types whose variation is linked with geology, soil properties or management. This empirical approach is a reasonable one on practical grounds, but it brings together, under the same heading, communities of very different ecological character, almost any of which may also be found under other major headings. Thus there are stress-tolerant groups on mine-waste, in quarries, in rutted tracks and on new road-banks; there are nutrient-demanding ruderals in gardens, on farmland, verges and rubbish tips. In these circumstances, the selection of 'typical species' becomes a rather esoteric operation, using comparatively uncommon plants some of which may well be absent from some of the sites they are chosen to represent.

Exactly the reverse is true of the computer analysis, although many of the stands are from sites also described in section 8.1. It is inevitable that the species selected by the computer as indicators should be ones which occur in a substantial proportion of the stands, and are thus common species of rather wide ecological amplitude: common bent, red fescue and ribwort plantain in Group 0, for example, or shepherd's-purse, scented mayweed and annual meadow-grass in Group 1. The branches of the dendrogram are also far from evenly balanced: Group 0 descends in a unilateral cascade, shedding a series of small groups on the way. This geometry suggests a high degree of heterogeneity in the sampled material and a low level of association, which is precisely what one would expect of ruderal communities. The two approaches give very different but equally interesting pictures of a complex situation: numbered cross-references like those used in Chapters 5 and 6 would be pointless here.

In the primary division of the quadrat data (Fig. 8.1), 16 stands from cultivated land form Group 1. The indicators for this group – annual meadow-grass, shepherd's-purse, wild chamomile, and American willowherb – are much more characteristic of phosphate- and nitrogen-rich (see Ellenberg 1979), recently disturbed situations than the grassland plants which are the indicators for Group 0. Group 1 is then divided into Group 10 with seven stands all from arable crops, and Group 11 with nine stands mostly from waste tips, disturbed places and gardens. The indicators for Group 10 are all annual weeds; those for group 11 are all perennial, suggesting less frequently disturbed conditions than those prevailing for Group 10 stands. They include phosphate- and nitrogen-indicators such as white clover and broad-leaved dock.

Group 1 indicators
Poa annua, Capsella bursa-pastoris, Matricaria recutita, Epilobium ciliatum

Group 0 indicators
Agrostis capillaris, Festuca ovina, Dactylis glomerata, Centaurea nigra, Festuca rubra, Plantago lanceolata

Group 10 indicators
Polygonum aviculare, Matricaria recutita, Matricaria matricarioides

The first division of Group 0 is along familiar lines: the Group 01 indicators are all heath plants of poor, acid soils. Indeed, Group 01 stands out as having a significantly lower mean pH, and also a lower mean species number than any other group (see Fig. 8.2). Most of its stands are from coal spoil tips and siliceous rock quarries. The Group 00 indicators are all relatively lime-indifferent (Ellenberg 1979), being widespread species of unfertilised but not particularly acid situations. Group 00 is large and diverse; it took three further divisions (splitting off the relatively small Groups 001, 0001 and 00001) to reduce it to the relatively homogeneous Group 00000. Most of the 8 stands in Group 001 are from limestone quarries. At the next level the indicators for Group 0001 are cow parsley, cleavers, red clover, and rough meadow-grass, all plants of nutrient-rich soils. The six stands of Group 0001 are from tips, disturbed road verges and field margins and are intermediate with those of Group 1 but are perhaps less, and less recently disturbed.

Group 11 indicators
Epilobium ciliatum, Trifolium repens, Rumex obtusifolius, Cerastium fontanum

Group 01 indicators
Deschampsia flexuosa, Polygala serpyllifolia, Calluna vulgaris, Nardus stricta

Group 00 indicators
Holcus lanatus, Festuca rubra, Hieracium pilosella

Group 0001 indicators
Anthriscus sylvestris, Galium aparine, Trifolium pratense, Poa trivialis

Of the three indicators for Group 0000 cat's-ear and ribwort plantain are rosette plants, while common bent is a hemicryptophyte (plant with its perennating buds at ground level) which is also well able to withstand trampling, grazing and mowing. In the final division Group 0000 splits almost equally. Group 00000 is the least recently disturbed of all considered in this study. Its nine stands are from roadbanks, quarries and old spoil tips and its indicator species are false oat-grass, common daisy, hawthorn, red fescue and mouse-ear hawkweed. In contrast, the indicators for Group 00001, sheep's sorrel and Yorkshire fog, are suggestive of rather more stressed situations and less rich soils. Group 00001 stands are mostly from more recently worked quarries and spoil tips; some have affinities with Group 11.

Group 0000 indicators
Hypochoeris radicata, Agrostis capillaris, Plantago lanceolata

Group 00000 indicators
Arrhenatherum elatius, Hieracium pilosella, Crataegus monogyna, Festuca rubra, Bellis perennis

Group 00001 indicators
Rumex acetosella, Holcus lanatus

42 of the 55 disturbed and ruderal quadrats are shown in the stand species matrix (Table 8.1).

The stands of Group 00000 are all of intermediate base status, and originally acquired their distinctive character as a result of disturbance; this has left its mark on the soil conditions and continues to favour the present vegetation.

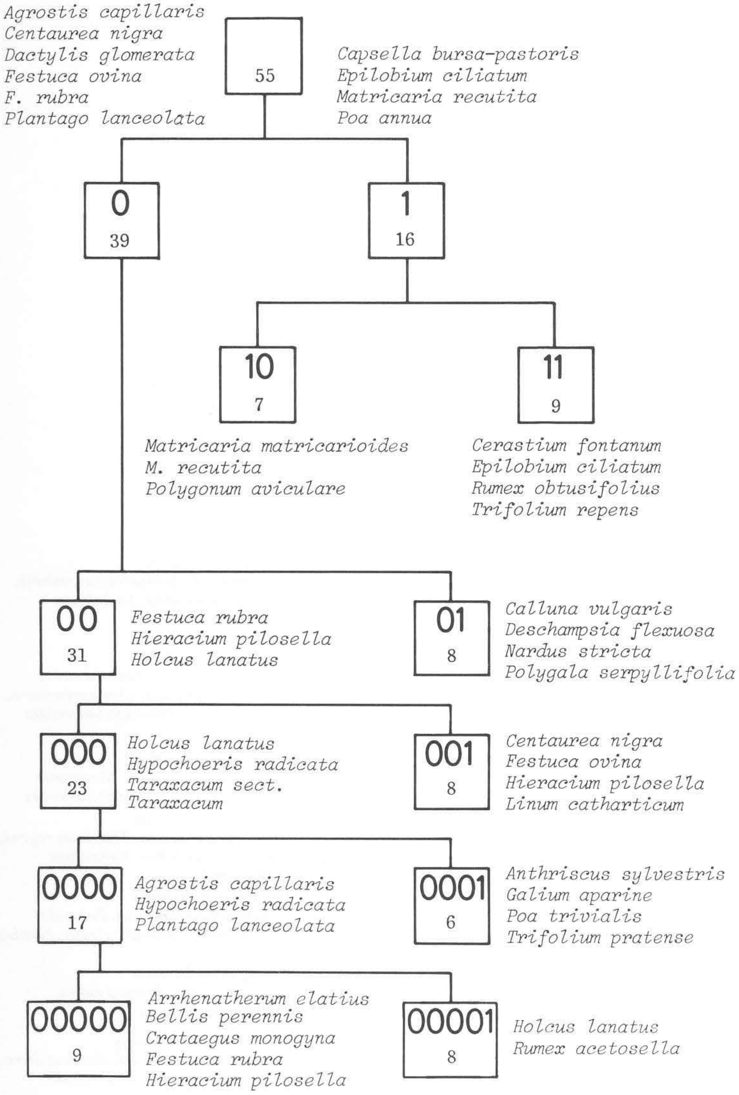


Figure 8.1 *Indicator species analysis of fifty-five 2m × 2m disturbed and ruderal stands from the Shropshire region. Group notations are shown in heavy type. The other figures in the squares give the numbers of quadrats. The most important division species are shown at each separation, each species being arranged on the side in which it tends to be present.*

Stand 1 is from the most extensive of the Shropshire lead mine spoil tips at Snailbeach. Much of the spoil at this site is very fine and almost completely devoid of vegetation. At the area sampled however the heaps include much coarse rock rubble which has a better developed vegetation, but there is still much bare rock and spoil, no doubt owing in part to the high levels of lead and zinc present. This mine ceased to operate in 1911 (Brook and Allbutt 1973). The ore-bearing veins are filled with spar, mostly calcite, and the calcite in the spoil gives a somewhat calcicole character to the vegetation.

Stand 2 is from a steep outcrop in the siliceous upper Silurian rocks of south Shropshire, which was quarried long ago and has yet to develop any appreciable depth of soil. Stand 3 is a south-facing road cutting through rather a lime-rich New Red Sandstone outcrop, whose vegetation is kept open by a combination of drought and crumbling of the rock surface. Stand 4 is another dry roadbank on the western side of the Long Mountain and was showing signs of drought even when recorded in mid-May. Stand 5 is a steep field bank, mostly occupied by scrub and coarse grasses, but with some patches of more open, species-rich vegetation on areas of shallower soil. Two similar roadbanks from other parts of the region have been omitted from Table 8.1.

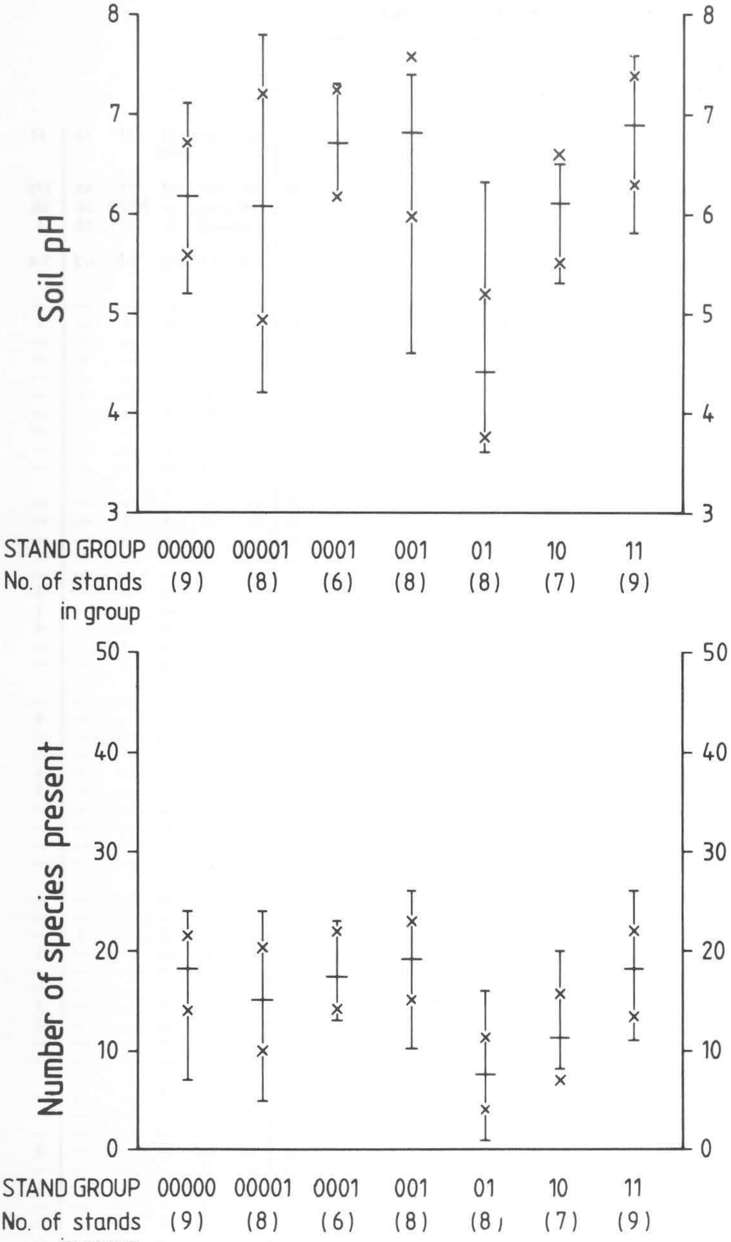


Figure 8.2 *Soil pH and species density (per 4m²) for the major polythetic divisive groups in fifty-five disturbed and ruderal stands from the Shropshire region. 95 per cent confidence limits are shown by the crosses. Soil pH was determined from samples taken at 0-5cm depth.*

The Group 00001 indicators, sheep's sorrel and Yorkshire fog, suggest rather more impoverished conditions than those enjoyed by Group 00000, and many of the stands are more recent in origin. Stand 6 is from a large and complex coal and clay spoil tip at Telford. Much of the area is occupied by fairly acid coal spoil colonised mainly by common bent and heather. Relief is undulating and drainage poor, with well-developed lichen and bryophyte communities in damper areas. Stand 6 (and another stand which was grouped with Group 00000) are very different, occurring on patches of calcareous clay spoil notable for a huge population of common spotted orchid; Stand 7 is fairly typical of the vegetation which develops on the more calcium-poor sandstones of Shropshire, again often with a high proportion of cover from non-vascular plants.

Rumex acetosella, Holcus lanatus

Agrostis capillaris, Calluna vulgaris

Bryophytes and lichens from damp acid coal spoil close to stand 6 *Campylopus introflexus, Ceratodon purpureus, Dicranella heteromalla, Polytrichum commune, P. formosum, Pohlia nutans, Rhacomitrium lanuginosum, Cladonia floerkeana, C. furcata, C. impexa, C. squamosa, Hypogymnia physodes*

Dactylorhiza fuchsii

Bryophytes and lichens from stand 7 *Polytrichum juniperinum, P. urnigerum, Cladonia chlorophaea, C. pityrea*

Table 8.1 *Stand-species matrix for 42 of the disturbed and ruderal habitat plots, each of which had an area of four square metres. Cover abundance values (recorded on the Domin scale) are given for the species recorded.*

	STAND NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	POLYTHETIC DIVISIVE GROUP	00000					00001						0001					
	Altitude (m)	213	380	103	155	61	191	94	107	100	76	80	50	107	90	75	85	170
	Aspect	NE	WSW	SSE	W	WNW	—	N	NE	WSW	—	W	SSW	irreg.	—	NNW	SE	SE
	Slope (°)	5–10	45–90	45	53	20	0	40	38	15–20	0	10	0–10	irreg.	0	35	20	5
	Soil pH	7·0	5·6	6·5	5·6	6·5	5·8	5·3	6·1	6·5	8·1	7·8	6·9	7·4	7·2	6·0	6·2	7·4
1	*Achillea millefolium*	—	—	—	3	—	—	—	—	3	—	4	1	—	—	—	—	—
2	*Agrostis capillaris*	1	1	—	—	5	6	4	—	4	—	8	—	—	4	4	—	3
3	*A. gigantea*	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—
4	*A. stolonifera*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—
5	*Aira praecox*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	*Alliaria petiolata*	—	—	—	3	—	—	—	—	—	—	—	—	5	—	—	—	—
7	*Anthriscus sylvestris*	—	—	—	—	—	—	—	—	—	—	—	7	4	1	—	—	—
8	*Aphanes arvensis*	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—
9	*Arabidopsis thaliana*	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	*Arctium lappa*	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—
11	*Arenaria serpyllifolia*	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—
12	*Arrhenatherum elatius*	2	—	4	—	2	—	—	—	—	—	—	—	—	4	1	—	—
13	*Artemisia vulgaris*	—	—	—	—	—	—	—	—	—	1	—	—	1	6	—	—	—
14	*Betula pendula*	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
15	*Bellis perennis*	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
16	*Blackstonia perfoliata*	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	2
17	*Brachypodium sylvaticum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
18	*Briza media*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
19	*Bromus hordeaceus*	—	—	—	5	—	—	—	—	—	—	—	—	—	—	4	—	—
20	*B. sterilis*	—	—	—	—	—	—	—	—	—	—	—	—	7	—	2	—	—
21	*Calluna vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22	*Campanula rotundifolia*	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
23	*Capsella bursa-pastoris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24	*Cardamine hirsuta*	—	1	2	—	—	—	—	—	—	—	—	—	1	—	—	—	—
25	*Carex flacca*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
26	*Centaurea nigra*	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	1
27	*Centaurium erythraea*	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
28	*Cerastium fontanum*	2	—	2	—	—	—	—	—	2	1	4	—	—	—	—	—	—
29	*C. glomeratum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	*Chamerion angustifolium*	—	—	—	—	—	2	—	1	2	—	—	4	—	—	—	—	—
31	*Chenopodium album*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	*Cirsium arvense*	—	—	—	—	—	1	—	—	1	—	3	—	—	—	—	—	—
33	*C. vulgare*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	3	—
34	*Crataegus monogyna*	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	1
35	*Crepis capillaris*	—	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—
36	*Dactylis glomerata*	2	1	1	—	2	1	—	4	—	3	—	1	—	—	—	—	—
37	*Danthonia decumbens*	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	5
38	*Daucus carota*	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
39	*Deschampsia cespitosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40	*D. flexuosa*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
41	*Elymus repens*	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—
42	*Epilobium ciliatum*	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—
43	*Erophila verna*	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
44	*Festuca ovina*	—	3	—	4	—	—	6	—	—	—	—	—	—	—	—	—	2
45	*F. rubra*	5	—	3	—	4	—	7	—	—	—	5	4	2	—	—	—	—
46	*Fragaria vesca*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
47	*Fraxinus excelsior*	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—
48	*Galium aparine*	—	—	1	—	—	—	—	—	—	—	—	1	—	2	—	1	—
49	*G. saxatile*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50	*G. verum*	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
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130	229	95	46	120	390	180	352	485	475	395	48	65	65	65	90	76	145	76	88	60	91	250	50	90	
SW	S	SE	WSW	—	—	SSW	N	ESE	—	—	SSW	—	—	W	—	WSW	S	—	—	WNW	WNW	—	—	SW	
25	15-30	30	55	0	0	15-20	35	45	0	0	18	0	0	25	0	5–16	35	0	0	5	35	0	0	5	
6·7	7·2	6·9	7·6	4·6	6·3	3·6	5·0	4·7	4·2	6·3	3·7	6·4	6·1	5·3	5·6	6·4	5·8	7·6	6·2	6·5	—	7·2	6·7	7·1	
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6	5	4	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25
3	2	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26
3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	27
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—	4	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	37
—	2	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	39
—	—	—	—	—	—	2	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	2	2	—	—	4	3	42
—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	3	3	—	—	—	43
5	—	4	—	—	7	3	4	8	7	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	44
—	5	—	3	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45
3	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46
—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	48
—	—	—	—	—	—	—	—	3	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49
—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50

51	*Geranium molle*	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
52	*G. dissectum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
53	*Hieracium pilosella*	4	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	4
54	*Holcus lanatus*	—	—	4	—	3	1	2	2	4	4	4	—	—	4	2	4	—
55	*Hordeum vulgare*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
56	*Hypericum perforatum*	—	—	—	1	—	—	—	—	4	—	—	2	—	—	—	1	—
57	*Hypochoeris radicata*	—	—	3	—	—	4	3	2	—	4	2	—	—	—	—	—	—
58	*Lamium album*	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—
59	*L. amplexicaule*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	*L. purpureum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
61	*Lapsana communis*	—	—	—	—	—	—	—	—	—	—	—	—	3	2	—	—	—
62	*Leontodon autumnalis*	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	3
63	*L. hispidus*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	*Leucanthemum vulgare*	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
65	*Linaria vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
66	*Linum catharticum*	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
67	*Lolium perenne* ssp. *perenne*	—	—	—	—	—	—	—	1	—	4	6	—	1	—	2	—	—
68	*L. perenne* ssp. *multiflorum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
69	*Lotus corniculatus*	—	—	—	—	—	4	4	—	—	—	—	—	—	—	—	—	4
70	*Luzula campestris*	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
72	*Matricaria matricarioides*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
72	*M. recutita*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
73	*Medicago lupulina*	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	7	—
74	*Moenchia erecta*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
75	*Myosotis discolor*	—	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—
76	*Nardus stricta*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
77	*Papaver dubium*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
78	*P. rhoeas*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
79	*Pimpinella saxifraga*	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—
80	*Plantago lanceolata*	—	—	4	4	6	—	—	—	2	4	2	—	—	—	—	—	4
81	*P. major*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
82	*Poa annua*	—	—	—	—	—	—	—	—	—	3	—	—	—	—	5	—	—
83	*P. pratensis*	—	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—
84	*P. trivialis*	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	3	—
85	*Polygala serpyllifolia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
86	*P. vulgaris*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
87	*Polygonum aviculare*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
88	*P. persicaria*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
89	*Prunella vulgaris*	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
90	*Ranunculus bulbosus*	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
91	*R. repens*	—	—	—	—	—	—	—	—	—	—	—	—	2	2	—	—	—
92	*Rubus fruticosus* agg.	—	—	2	—	—	—	—	—	—	1	—	4	4	—	2	—	1
93	*Rumex acetosella*	—	—	—	—	—	—	2	2	1	—	6	—	—	—	—	—	—
94	*R. obtusifolius*	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
95	*Sagina procumbens*	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—
96	*Senecio jacobaea*	—	—	2	—	—	3	—	—	—	2	—	—	—	—	—	—	—
97	*S. vulgaris*	—	—	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—
98	*Sisymbrium officinale*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
99	*Sonchus asper*	—	—	—	—	—	—	—	—	2	—	1	—	—	—	1	1	—
100	*S. oleraceus*	—	—	2	—	—	—	—	—	—	—	—	—	—	1	—	—	—
101	*Stellaria media*	—	—	—	—	—	—	—	—	—	—	—	—	2	—	3	—	—
102	*Taraxacum* sect. *Taraxacum*	—	—	1	4	—	—	—	—	2	3	2	—	1	—	1	—	—
103	*Thlaspi arvensis*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
104	*Thymus praecox*	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	4
105	*Trifolium dubium*	—	—	—	—	1	—	—	2	2	4	5	—	—	—	—	—	—
106	*T. pratense*	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—
107	*T. repens*	4	—	—	—	1	3	—	—	—	6	6	—	—	—	4	7	—
108	*Tripleurospermum inodorum*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—
109	*Tussilago farfara*	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—
110	*Urtica dioica*	—	—	—	—	—	—	—	—	—	—	—	2	1	3	—	—	—
111	*U. urens*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
112	*Veronica arvensis*	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—
113	*V. chamaedrys*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
114	*V. persica*	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
115	*Vicia sativa* ssp. *nigra*	—	—	3	2	—	—	—	—	—	—	—	—	—	—	—	—	—
116	*V. sativa* ssp. *sativa*	—	—	—	1	—	—	—	—	—	3	—	—	2	—	—	—	—
117	*Vulpia myuros*	—	—	—	—	—	—	—	—	3	5	—	—	—	—	—	—	—
	Species per stand	16	15	20	23	17	16	10	14	24	18	17	14	23	18	21	13	22
	Stand number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	1	—	—	—	—	—	—	—	—	—	51
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	52
4	3	—	4	1	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	53
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	2	—	—	—	—	54
—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	2	—	—	—	—	—	—	—	—	—	55
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	56
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	57
—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—	—	—	58
—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2	—	—	—	—	—	—	—	—	59
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	1	—	—	—	—	—	60
—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	61
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	62
—	3	5	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	63
—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	65
3	3	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66
—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	4	—	2	—	—	—	—	67
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	68
—	5	4	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	69
—	—	2	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	70
—	—	—	—	—	—	—	—	—	—	—	—	3	4	—	4	—	—	—	—	—	—	—	—	—	71
—	—	—	—	—	—	—	—	—	—	—	—	2	2	1	3	—	1	—	—	—	—	—	1	—	72
—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	3	—	—	—	—	73
—	—	—	—	—	3	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	75
—	—	—	—	—	—	—	—	—	4	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	76
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	2	—	—	—	—	—	—	77
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	78
—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	79
—	—	—	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	80
—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	3	—	—	—	3	1	1	—	—	—	81
—	—	—	—	2	—	—	—	—	—	4	—	5	—	2	6	1	5	3	7	2	3	2	—	3	82
—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	2	83
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	84
—	—	—	—	—	—	1	—	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	85
1	2	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	86
—	—	—	—	—	—	—	—	—	—	—	—	3	2	2	4	—	—	—	—	—	—	—	—	—	87
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	1	—	—	88
1	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	89
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	4	91
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	92
—	—	—	—	—	1	3	2	—	—	2	3	—	—	—	—	—	—	—	—	—	—	—	—	—	93
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	4	—	—	2	1	—	94
—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	4	—	—	2	—	95
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	96
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	2	1	—	—	—	97
—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	2	—	3	—	—	—	—	—	—	98
—	—	—	—	—	—	—	—	—	—	—	—	2	—	3	1	—	3	—	—	—	—	—	—	—	99
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—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	2	8	9	—	1	—	—	—	—	—	101
—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	2	2	—	—	—	102
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—	—	103
2	2	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	104
—	—	—	—	—	4	—	—	—	—	5	—	—	—	—	—	—	—	—	1	4	—	—	—	—	105
—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	106
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—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3	—	—	—	112
—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	113
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	1	2	—	—	—	—	114
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	115
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	116
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	5	—	—	—	—	117
18	21	21	20	10	15	8	6	8	10	16	5	15	9	12	20	13	21	17	22	26	11	12	14	23	
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

GROUP 00000

1 Lime-rich lead-mine spoil, Snailbeach, Stiperstones. National grid reference SJ 374023. Coarse and fine siltstone and calcite debris. *(Arenaria serpyllifolia* 3, *Clematis vitalba* 1, *Equisetum arvense* 3, *Euphrasia* sp. 2, *Hieracium* sp. 3, *Rumex acetosa* 4, *Quercus robur* seedling 1).

2 Steep, quarried, mudstone rock exposure, Holloway Rocks, Knighton. SO 313742. Thin organic loam soil with bare rock and rock debris from this Upper Silurian exposure. (*Asplenium trichomanes* 1, *A. adiantum-nigrum* 2, *A. ruta-muraria* 1, *Hieracium* sp 1, *Poa nemoralis* 4, *Sedum forsteranum* 4, *Teucrium scorodonia* 5, *Umbilicus rupestris* 1).

3 Steep rock exposure in roadbank, Bridgnorth Road, near Hilton. SJ 804957. Sand and sandstone rock debris from Upper New Red Sandstone (Keuper).
(Senecio squalidus 2, *Verbascum thapsus* 1).

4 Steep verge of unmetalled road, Long Mountain near Gelli, Montgomeryshire. SJ 262083.
(Bromus sterilis 5, *Carex* sp. 3, *Orchis mascula* 1, *Ranunculus ficaria* 4, *Veronica hederifolia* 4).

5 Uncultivated area in steep fieldbank, Rudge, near Pattingham. SO 804978. Sandy loam.
(Erodium cicutarium 3, *Taraxacum* sect. *Erythrosperma* 2, *Vicia lathyroides* 3).

GROUP 00001

6 Clay spoil tip, Stoney Hill, Telford. SJ 669062. Clay with some loam. *(Leucanthemum vulgare* 2, *Dactylorhiza fuchsii* 3).

7 Steep road verge, Boningale, Albrighton. SJ 821027. Sand *(Anthoxanthum odoratum* 4, *Salix caprea* seedling 1).

8 Unstable sand slope, disused sand quarry, Dorrington. SJ 475041. Glacial sands.
(Lupinus arboreus 2, *Ornithopus perpusillus* 2, *Sarothamnus scoparius* 1, *Senecio sylvaticus* 4, *Vulpia bromoides* 4).

9 Abandoned railway sidings, Alveley. SO 747839. Gritty furnace slag spoil.
(Aira caryophyllea 3, *Hieracium* sp 3, *Reseda lutea* 4, *Sagina apetala* 1, *Trifolium arvense* 4, *Vulpia bromoides* 2.

10 Land cleared of buildings, Newport. SJ 747183. Rubbly sand over Bunter sandstone. *(Trifolium campestre* 7, *Vicia hirsuta* 3).

11 Newly constructed road verge, Tong. SJ 800065. Sand on sand and gravel drift. *(Carduus nutans* 2, *Ranunculus acris* 2, *Rumex crispus* 2).

GROUP 0001

12 Old bank on site of demolished buildings. Bedlam furnaces, Ironbridge. SJ 679034. Loam with brick rubble and decomposing household refuse. *(Rubus idaeus* 4, *Solanum dulcamara* 3).

13 Disturbed and shaded roadbank with garden refuse, Pound Green, Wyre Forest. SO 758788. Sandy loam. *(Arum maculatum* 3, *Conopodium majus* 1, *Festuca gigantea* 1, *Geranium robertianum* 1, *Glechoma hederacea* 2, *Myosotis sylvatica* 2).

14 Arable field margin, Sutton Maddock near Telford. SJ 726008. Light sandy loam.

15 Verge between road and arable field, near Uppington. SJ 585096. Loam on boulder clay drift. *(Equisetum arvense* 4, *Triticum aestivum* 1, *Ulex europaeus* 2).

16 Embankment for new motorway, Tong. SJ 798068. Sand. *(Aethusa cynapium* 1, *Vicia hirsuta* 1).

GROUP 001

17 Dry limestone quarry bottom, Llanymynech. SJ 268219. Fine debris with some organic matter on Carboniferous limestone. *(Anacamptis pyramidalis* 1, *Carlina vulgaris* 2, *Hieracium* sp. 1)

18 Fine limestone spoil slope, Benthall Edge quarry, Ironbridge. SJ 666034. Fine Silurian limestone debris. *(Inula conyza* 2, *Listera ovata* 1).

19 Sheep-grazed limestone spoil slope, the Novers, near Clee Hill. SO 598734. Fine Carboniferous limestone spoil with rock debris (*Plantago media* 4).

20 Steep roadbank, Pant, near Oswestry. SJ 280232. Shallow clay loam soil on Carboniferous limestone rubble.
(Erigeron acer 2, *Knautia arvensis* 2, *Leontodon taraxacoides* 5, *Orchis mascula* 2, *Spiranthes spiralis* 2).

21 Railway embankment, Severn Valley Railway, Highley. SO 752824. Clay. *(Hieracium* sp. 3, *Senecio erucifolius* 2, *Trisetum flavescens* 4, *Vicia sylvatica* 5).

22 Pasture on clay spoil tip, Wellington, Telford. SJ 682111. Clay with some organic matter. *(Lathyrus pratensis* 1).

23 Sheep-grazed heaps of fine quarry spoil, Clee Hill. SO 599775. Thin organic soil over fine siliceous spoil. *(Carex caryophyllea* 3).

GROUP 010

24 Old coal spoil tip, Dawley, Telford. SJ 679073. Fine siltstone spoil with considerable organic matter. *(Ulex europaeus* 3).

25 Acid lead mine spoil tip, the Bog, Stiperstones. SO 356979. Fine siltstone debris. *(Euphrasia* sp. 1).

26 Coarse dolerite spoil heap, Titterstone Clee. SO 592777. Organic soil over coarse, boulder-strewn dolerite debris. *(Botrychium lunaria* 3).

27 Trampled area in quarry floor, Titterstone Clee dolerite quarry. SO 593776. Damp organic soil. *(Cirsium palustre* 2, *Juncus squarrosus* 2, *Potentilla erecta* 3, *Vaccinium myrtillus* 5, *Veronica officinalis* 2).

GROUP 011

28 Road verge at entrance to Quarry, Clee Hill. SO 597775. Organic material and fine dolerite spoil. *(Montia fontana* 2, *Plantago coronopus* 3, *Trifolium micranthum* 3).

29 Vegetation colonising burnt area of slopes with rock outcrops, Haughmond Hill, Shrewsbury. SJ 544134. Sandy loam over Pre-Cambrian shales.
(Senecio sylvaticus 2, *Teesdalia nudicaulis* 2).

GROUP 10

30 Edge of wheat crop, arable field, Harper Adams Agricultural College, Newport. SJ 710198. Sand over bunter sandstones. *(Triticum aestivum* 2).

31 Edge of barley crop, arable field, Harper Adams Agricultural College, Newport. SJ 710198. Sandy loam over Bunter Sandstones. *(Solanum nigrum* 1).

32 Uncultivated slope treated with herbicides, Harper Adams Agricultural College, Newport. SJ 712198. Sandy loam over Bunter Sandstones.

33 Arable field, near Welshampton. SJ 436341. Light loam with little organic matter on sand and gravel drift over Keuper Marl.
(Anagallis arvensis 1, *Gnaphalium uliginosum* 1, *Myosotis arvensis* 2, *Polygonum hydropiper* 1, *Spergula arvensis* 2, *Veronica agrestis* 1, *Viola arvensis* 2).

GROUP 111

34 Field used for horticultural crops, near Hilton. SJ 799958. Sandy loam over upper New Red Sandstone.

35 Recently constructed Motorway embankment, near Telford. SJ 714093. Clay. *(Aethusa cynapium* 1, *Holcus mollis* 2, *Stachys arvensis* 1, *Veronica hederifolia* 1, *Viola arvensis* 1).

36 Land cleared of buildings, Newport. SJ 747183. Sand and rubble over Bunter Sandstone. *(Euphorbia helioscopia* 1, *Hordeum murinum* 7).

37 Derelict urban land, Shifnal. SJ 750082. Loam.
(Aegopodium podagraria 2).

38 Abandoned area of a sand quarry, Buildwas. SJ 640034. Fine sandy loam. *(Sherardia arvensis* 1).

39 Abbey ruins, Haughmond Abbey, Shrewsbury. SJ 541151. Plants rooted in cracks in rubbly mortar.
(Sagina apetala 1, *Saxifraga tridactylites* 3).

GROUP 110

40 Old midden in an ox-bow lake, Abertanat. SJ 250217. Organic soil. *(Atriplex patula* 2, *Bidens tripartita* 5, *Chenopodium rubrum* 4, *Polygonum hydropiper* 4, *P. lapathifolium* 2, *Ranunculus sceleratus* 7, *Rumex conglomeratus* 2, *Salix fragilis* sapling 1).

41 Waste tip, Jackfield, Ironbridge. SJ 688029. Organic loam and blast furnace spoil. *(Buddleja davidii* 2, *Salix caprea* 2).

42 Garden path, Pant, near Oswestry. SJ 277224. Light loam with limestone rubble. *(Leucanthemum maximum* 2, *Crocus* sp 2, *Cynosurus cristatus* 2, *Geranium lucidum* 3, *Helianthemum nummularium* 1, *Hypericum* sp 3, *Iberis umbellata* 2, *Lupinus polyphyllus* 1, *Melissa officinalis* 2, *Primula veris* 3, *Stellaria holostea* 2, *Veronica serpyllifolia* 2, *Vinca minor* 2).

Stand 8 is from a steep, unstable slope left in an abandoned sand quarry. Other species nearby included evening-primrose, weld, hairy tare, and field madder. Stand 9 is an example of the vegetation colonising a fine-textured slaggy spoil used to surface abandoned sidings on the Severn Valley railway. A similar spoil at Oakengates had wild carrot, weld and Oxford ragwort. Stand 10 – urban land cleared for building on the Bunter sandstone at Newport – has a higher pH than the previously described members of the group but similar vegetation. Stand 11 is a recently regraded road-verge on lime-rich sandy soil similar to that of Stand 10.

Oenothera erythrosepala, Reseda luteola, Vicia hirsuta, Sherardia arvensis

Daucus carota, Reseda luteola, Senecio squalidus

The six stands of Group 0001 (only 5 are shown in Table 8.1) have been characterised above as tips, road-verges and field margins intermediate between the high nutrient stands of Group 1 and the rest of Group 0. Stand 12 is an old embankment, containing the buried remains of old buildings, subject to the dumping of household rubbish, and covered with tall herbs. Stand 13 is a road verge also subject to dumping of garden and other rubbish, but receiving some shade from hedgerow ash and field maple. Stand 14 is an uncultivated margin of an arable field; stand 15 is a steep roadbank, constructed two years before its vegetation was recorded, and clearly affected by run-off and spray drift from neighbouring arable land. Stand 16 is from a roadbank of a new motorway constructed less than a year previously.

Fraxinus excelsior, Acer campestre

As previously indicated, Group 001 represents the calcareous extreme of Group 0 and consists mostly of examples of limestone quarry vegetation. Stands 17 and 19 are from Carboniferous limestone spoil, and stand 18 is from Silurian limestone. A stand from a small quarry in the Carboniferous limestone at Farlow north-east of Titterstone Clee has similarities to stands 17 and 19 but was classified with Group 0000. This quarry has been long abandoned and is heavily sheep-grazed and well vegetated. A similar stand from an old quarry on Wenlock Edge is included in Table 6.1 (Stand 10).

Stand 20 is from a roadbank cut into Carboniferous limestone less than 20 years ago which has rapidly developed a rich limestone flora. Other plants growing near this stand include hawkweed oxtongue, yellow oat-grass, goldenrod, quaking-grass, and a hybrid hawkbit. Stand 21 is also highly calcareous, but is from heavy clay in a railway cutting on the Severn Valley Railway. Adjacent species also differ from those of the quarry stands: hemp-agrimony, primrose, tall fescue and meadow fescue.

Picris hieracioides, Trisetum flavescens, Solidago virgaurea, Briza media, Leontodon hispidus × taraxacoides

Eupatorium cannabinum, Primula vulgaris, Festuca arundinacea, F. pratensis

Stands 22 and 23 are not from limestone sites: stand 22 is from a fairly lush pasture developed on clay spoil and grazed by rabbits and horses. Stand 23 is from fine-textured base-rich spoil from the Clee Hill dolerite quarries, and is sheep-grazed.

The remaining eight stands form Group 01, the 'heathy' extreme of Group 0. The analysis subdivided Group 01 to give Group 010 with virtually the same indicators as Group 01, and Group 011 with early hair-grass, sheep's sorrel, sticky mouse-ear, and common whitlowgrass as indicators. This assemblage suggests drier, less extremely acid conditions and the division has parallels with that of the heathy stands in Chapter 6.

Aira praecox, Rumex acetosella, Cerastium glomeratum, Erophila verna

The coal spoil tips of Telford are well represented in Group 010, stand 24 providing an example from an old, well-colonised coal spoil tip. The most characteristic vascular plant species of these tips are heather and wavy hairgrass, with silver birch as an early colonist. North-facing slopes may have a well-developed bryophyte flora, as the list for a heather-wavy hairgrass stand at Donnington Wood demonstrates.

Calluna vulgaris, Deschampsia flexuosa

Betula pendula

Bryophytes from a north-facing stand on coal spoil at Donnington Wood *Eurhynchium praelongum, Dicranum scoparium, Pohlia nutans; Diplophyllum albicans, Lophozia ventricosa, Ptilidium ciliare*

Stand 25 is an example of similar vegetation which has developed on the only extensive base-poor spoil tip at a Shropshire lead mine. The grasses form a very characteristic pattern of tussocks in a matrix of lichen-colonised spoil. Stand 26 is from a similar type of tussocky vegetation which developed on coarse dolerite spoil slopes at Titterstone Clee, and stand 27 is from a rather trampled area in the bottom of a quarry at the same site.

Lichens from stand 25 *Cladonia verticillata, C. subulata, Stereocaulon dactylophyllum, S. vesuvianum*

Group 011 is represented by stands 28 and 29 in Table 8.1. Stand 28 is an example of trampled and sheep-grazed vegetation on fine, rather base-rich spoil at Titterstone Clee and forms a link between stands 26 and 27, and stand 23 (Group 0011) which is a grazed and base-rich area of spoil, not subject to trampling, also from Titterstone Clee. Stand 29 is from an area of shaly rock outcrops, four years after a serious fire.

The remaining thirteen stands described in Table 8.1. represent Group 1, the high-nutrient habitats. The Group 10 stands have been previously characterised as arable crop stands. Modern agricultural crops do not have an extensive weed flora owing to the practically universal use of herbicides. Nevertheless weeds maintain a hold in the headlands and field margins which sometimes escape the spray, and stands 30 and 31 give an impression of this flora of arable field margins. Stand 32 is from an uncropped farm area periodically treated with herbicides. Stand 33 is an uncharacteristically ill-drained arable field, observed in September after the clearing of a barley crop.

Agrostis gigantea, A. stolonifera, Poa annua, P. pratensis, P. trivialis, Avena fatua, Bromus sterilis

Group 11 includes stands from a more diverse range of cultivated habitats, mostly less regularly disturbed than the Group 01 stands. Group 11 has been further divided, and Group 111, with groundsel, shepherd's-purse, greater plantain, and common field speedwell as indicators, does include one stand from a regularly cropped area: stand 34 is used largely for horticultural vegetable cultivation and is treated regularly with herbicides. Group 111 is presented before Group 110 in Table 8.1. Stands 35-7 are all from areas intermediate in character with Group 0001 and form further examples of tips and other disturbed areas. The Group 111 examples do, however, seem to be more nutrient-rich and more recently disturbed than the Group 0001 stands.

Group 111 indicators
Senecio vulgaris, Capsella bursa-pastoris, Plantago major, Veronica persica

Stand 35 is a clay subsoil roadbank recently constructed for a new motorway. Stand 36 is from the same area of building land as stand 10 but is much more recently disturbed. The two sites share annual meadow-grass and rat's-tail fescue, but stand 36 lacks the perennial ruderals such as mugwort and ragwort seen in stand 10. Stand 36 also includes many annual weeds not seen in stand 10, e.g. thale cress, barren brome, sun spurge, and long-headed poppy. Stand 37 is an area of urban wasteland subject to topsoil and garden waste dumping and the list includes both annual and perennial weeds.

Poa annua, Vulpia myuros

Artemisia vulgaris, Senecio jacobaea

Arabidopsis thaliana, Bromus sterilis, Euphorbia helioscopia, Papaver dubium

The remaining two stands from Group 111 are from rather different situations: stand 38 is from a flat area in an old sand quarry with a very rich and diverse flora including a number of species which evade drought by being ephemeral annuals e.g. hairy bitter-cress, common whitlowgrass, and changing forget-me-not, as well as more recognisably weedy species. The vegetation of stand 39, from the ruined wall foundations of Haughmond Abbey, is even more clearly affected by drought rather than by disturbance. The vascular plants are associated with rubbly mortar rather than with the stone surfaces.

Cardamine hirsuta, Erophila verna, Myosotis discolor

Group 110, with common bent and common nettle as indicators, represents three very different ecological situations and its stands are characterised mainly by high soil nitrogen and phosphorus status. They are also probably less frequently disturbed than the other Group 1 stands. Stand 40 has many of the features of a farm midden; slurry having been tipped into an old ox-bow lake as a means of disposal rather than temporary storage. The surface layer is semi-liquid to 20 cm depth and the flora includes some marsh plants as well as agricultural weeds. Stand 41 is an old industrial tip, consisting largely of furnace slag but also subject to fly-tipping of household refuse. Stand 42 is from a garden path on the Carboniferous Limestone with a complex mixture of weeds, cultivars, and native limestone plants.

Agrostis capillaris, Urtica dioica

9 Ecological change, coincidence maps and conservation

Counterpoise bridge on Prees Branch of canal before dredging

9.1 The unwritten past

THE END of the last major glaciation is the conventional starting point for accounts of the origin and development of a local flora. The convenient but unproven assumption is usually made that the initial landscape was a *tabula rasa* devoid of living plants or animals. Since three quarters of our region are still covered in more or less thick deposits left by the melting ice, this hypothesis seems not unreasonable; the small areas of hill country and valley floors in the south-east could hardly have provided a refuge for more than a few of the hardiest and most stunted plants capable of surviving the rigours of the Full Glacial climate, and no such Arctic species are found within the region today (Chapter 4).

It is a safe assumption, then, that all the 1200 or so species dealt with in the present work have reached this region at some time during the past twelve millennia; but how can we determine when any particular species first arrived? The answer, in most cases, is that we cannot. We can only speculate on the basis of more or less indirect or circumstantial evidence.

The best, and rarest, kind of evidence is the finding of dateable fossil specimens of the species concerned. Special conditions are required for the preservation of such fossils, and these are most likely to exist in the sediments at the bottom of lakes or meres, and in the form of peat in the mosses or bogs which have developed in the basins of former meres (Bellamy *et al* 1960; Sinker 1962). Here seeds of water-lilies, rhizomes of reeds, leaves of willows or cranberries, twigs of heather and whole stumps or trunks of pine and birch may be found preserved in a recognisable state. Such remains often occur in distinct layers in the peat bogs and lake muds, recording both successional changes in the vegetation and variations in the regional climate.

If preserved plant remains were limited to such comparatively large fragments, the information available to us would be an interesting but very restricted record of the vegetation of a few specialised sites, most of them lying in a crescent from Whitchurch to Shrewsbury in the north-west of the region. Fortunately, however, the evidence is not so geographically restricted. Not only are the larger plant remains preserved, with occasional fragmentary animal remains and even human artefacts (see below): peat bogs and mere sediments also include a fraction of the seasonal rain of pollen produced by trees and flowers and carried, often for great distances, by the wind or by winged insects. Under the waterlogged, oxygen-deficient, cold and often acid conditions which prevail in these sites, the microscopic grains of pollen are extraordinarily well preserved. Their surfaces retain detailed features which make it possible to identify the kind of tree or other plant from which they came. By the appropriate treatment of standard samples to remove the coarser debris and to make the pollen grains more readily seen and counted, it is possible to assess the relative abundance of different types of tree or other flowering plant at any particular stage in the layered record. With techniques such as radiocarbon dating it is also possible to place a fairly accurate date on the material in a particular layer. Such information is obviously of great value when it is associated with one of the rare finds of objects made or used by man: a bronze palstave at Whixall Moss, for example, or the dug-out canoes at Whattal and near Marton Pool, Chirbury (Chitty 1928, 1956).

Detailed pollen analysis has been carried out on a very few sites in North Shropshire and at rather more in Cheshire (Hardy 1939; Turner 1964; Slater 1972; Beales and Birks 1973). These investigations agree with one another sufficiently to show that the past 12 000 years can be divided broadly into three phases: the first was a period of ice recession and the advance of pioneer species, weeds and dwarf shrubs; in the second phase, the forest cover greatly increased to a maximum both in area and in diversity of trees;

during the third, the increasing intensity of human agricultural activity reduced the forest cover in a sequence of irregular stages. The first phase was itself in three parts, with two relatively cold subarctic periods rather similar to the climate in the extreme north of Norway today, separated by a short episode when warmer conditions prevailed. At the end of the first phase, Late Glacial gave way to Postglacial conditions, with the climate steadily becoming warmer, though retaining the rather dry summers and severe winters of the earlier stages. Birch woodland spread through the region, preceded locally by juniper and accompanied by hazel scrub; in the later stages the birch was mixed with, and to some extent replaced by, pine.

Throughout this early woodland period it is likely that the tree cover was far from complete, and that there were extensive areas of more open ground on dry, south-facing slopes, in places where strong winds had caused blow-outs in loose sandy or gravelly soils, and on the higher rocky ridges of the hills. Soils in general were still in an immature state: relatively rich in lime and other available bases because leaching had not yet had time to remove them from the surface layers, but without the development of a thick organic deposit or humus which the roots of trees could bind and stabilise.

It is dangerous to speculate without direct evidence, but it may have been during this stage of shifting scrub and sunny clearings that some of the species requiring an unusual combination of sunshine, warmth, fertile soil and low competition first spread into this region. Species such as sticky catchfly (*Lychnis viscaria*), confined to south-facing rocky slopes on Breidden Hill (Jarvis 1971; Jarvis and Pigott 1973), must have reached their now isolated fastnesses at a time when conditions in the lowlands were more favourable for their spread than at any subsequent period.

About 5500 BC the climate became wetter as well as reaching its warmest level (the 'climatic optimum'); the forest cover spread to its maximum, and plants of open habitats were severely restricted (Pigott and Walters 1954). The woodlands on drier soils were very mixed, including much lime and elm as well as the characteristic oak of the English lowlands. At the same time the river valleys and other poorly drained hollows held a luxuriant jungle of alder which must have been a serious obstruction to the movements of the early human inhabitants of the region, as they were later to be an obstacle to clearance and cultivation in the New Stone Age. There is some evidence that the hills and ridges of the south and west of the region were less densely wooded: the concentration of finds of flint implements and other imported materials suggests the existence of ridgeway trade routes through Neolithic times and the Bronze Age (Chitty 1956). A well marked route ran eastwards from the Clun Forest over the Clee Hills; another running north past the stone axe factory at Brithdir and along the ridge of Stapeley Hill is still recorded in the place name Hemford (Welsh: *hen fordd*, old road). Near this ridgeway is a stone circle, Mitchell's Fold, and another called the Hoar Stones near Black Marsh. The latter was found by Miss L F Chitty (1926) to underlie and therefore ante-date a layer of blanket peat which must have developed during a wetter climatic phase; these stone circles are of Bronze Age date.

The last five thousand years have been generally cooler than the climatic optimum. The pollen record shows periods of forest clearance (C), undertaken as agricultural techniques improved and the population grew, alternating with phases of population decline or migration and the regeneration (R) of forest cover. These are summarised in Table 9.1, from Beales and Birks (1973). Several of them coincide with other well-attested prehistoric phases or historical events. C.3, for example, is the time when, in this region, there was a marked decline in the pollen of *Tilia* (lime), thought to have been the result of human activity. C.4 marks a period when the Iron Age hill forts of the borderland must have required a strong administrative infrastructure and very extensive areas of cultivation to support them. R.5 shows the spread of secondary forest during the Dark Ages, and R.6 the 'wasting' of Anglo-Saxon settlements after the Norman Conquest.

It is interesting to note that during the later clearance episodes not only cereals and weeds of cultivation, such as plantain, are recorded: there are also high pollen scores for hemp (*Cannabis*) and hops (*Humulus*). In C.7A rye and flax also appear as a characteristic feature of local Tudor agriculture.

From the Norman Conquest onward we can begin to rely on admittedly indirect documentary evidence, and on geographical features such as field patterns and settlement sites, to strengthen our still speculative reconstructions of earlier landscapes and their vegetation (Rowley 1972). The North Shropshire plain displays a comparatively closely-spaced network of small villages or hamlets, each sited on the 'best' land in its neighbourhood for cultivation of crops as close as possible to the dwellings (see 3.5).

Landscape change in this region, and particularly inclosure, was a gradual process spread over several centuries. Farms, initially concentrated in feudal villages with the ridge-and-furrow of open fields nearby, were gradually replaced by isolated farmsteads with new **assarts** or intakes of land acquired from the surrounding forest, much of which had previously been grazed in common. Parish boundaries often record to this day the lines of separation between the spheres of interest of neighbouring villages. It is significant that, while the villages tend to be sited on the most fertile and easily ploughed soils, the parish boundaries generally run over areas of poor soil – heavy waterlogged clay or dry sandy heath. It is on these marginal areas that we find numerous examples of a distinctive element in the Shropshire and Welsh border landscape – the 'squatter' settlement of scattered cottages, each with its own tiny plot of land once illegally enclosed from the common: these parish boundary settlements are often identifiable on the map because they have the word 'heath' in their name.

Table 9.1

Episode	Pollen-analytical characteristics	Ecological interpretation	Historical evidence
C7B	Increase in *Pinus, Ulmus, Quercus*, and Ericaceae.	Local afforestation and drainage of peatlands.	Attempts at reclamation of mosses: 18th to 19th century. Creation of plantations and parklands: early 19th century.
C7A	Increased weed pollen values.	Progressive deforestation and extension of farmland.	Considerable expansion of farmland with local establishment of abbeys (12th and 13th century); common pasture (13th and 14th century) and domestic agriculture (Tudor Period).
R6	*Betula-Alnus-Fraxinus* maxima. Low grass and weed pollen values.	Brief forest regeneration phase	Extensive areas laid waste; Norman Conquest and Domesday Survey (11th century).
C6	*Quercus* decline and increased weed and cereal values.	Oak wood clearance, probably on uplands. Mixed farming.	Important upland settlement; Norse colonisation (9th and 10th century).
R5	*Alnus-Fraxinus* maxima. Reduced grass and weed values.	Forest regeneration and limited agriculture.	Anglo-Saxon settlement of minor importance (6th to 8th century).
C5	High weed pollen values and apearance of cereals.	Forest clearance and extensive mixed farming.	Romano-British occupation; extensive farming.
R4	*Betula-Fraxinus* maxima.	Forest regeneration phase.	—
C4	Increased weed pollen values.	Forest clearance and beginnings of arable farming.	Iron Age hill forts with mixed economy.
R3	*Fraxinus* maximum.	Forest regeneration phase.	—
C3	Increased weed pollen values.	Forest clearance and pastoral economy.	Late Bronze Age; nomadic pastoralists.
R2	*Betula-Fraxinus* maxima.	Brief forest regeneration phase.	—
C2	Increased weed pollen values.	Small forest clearance and pastoral economy.	Early or Middle Bronze Age.
R1	Appearance of *Fraxinus* and increased *Ulmus* representation.	Forest regeneration phase.	—
C1	Decline of *Ulmus* and first appearance of *Plantago lanceolata.*	Small forest clearance with beginnings of pastoral economy.	'Secondary Neolithic Folk'; 3000 BC.

Inclosure of the remaining commons and the last of the open fields was brought about by Acts of Parliament from the mid-eighteenth to mid-nineteenth century, but was far less drastic in its impact on the Shropshire landscape than in some other parts of the Midlands, because so much had already taken place piecemeal over the previous centuries. The impact of the Industrial Revolution (which can claim its birthplace at Coalbrookdale within our region), the new attitude of responsibility – both commercial and social – in the land-owning class with its growing awareness of the need for conservation of natural resources, and the application of scientific methods to agriculture marked the end of a long period during which man's use of the rural landscape was still largely controlled by natural forces. It was the beginning of the phase of human domination of nature in which we are still living.

9.2 Systematic records and their interpretation

> "Notwithstanding large yearly falls of timber, there are still some very fine woods of oak growing in this county. There is a good deal of hedge-row timber also, consisting of oak and ash principally, a few wych and other elms, still fewer beech, lime and sycamore. Poplars are not uncommon by the sides of brooks and small rivers. There are a few yew trees and hollies have been plentiful, but that beautiful tree and useful fence appears to have been neglected or destroyed. Birches, both as a tree and fence, are common in the S.W. district."

> "Though there may be a call to plant in this country, still the duty is not so imperious a one, that it should be universally entertained. Like many general

> duties, it should yield to circumstances; and trees should not be reared in any quantity upon land that may be made subservient to agriculture or profitable pasture. When we are independent of foreign corn, we may calculate more minutely, probable importations of timber. Where trees can be planted to most public advantage, it generally happens that the scite [*sic*] is consistent with individual interest, and beneficial to public beauty."

Plymley, writing in 1803, reflects the new interest in the objective study of nature, and the stewardly responsibility of the landowner. We shall have cause to look again at his impressive *General View of the Agriculture of Shropshire*. Scientific agriculture and economically sound land management were of intense interest at the end of the eighteenth century. Aikin (1797) knew from observation that certain plants could be relied on "to denote the presence of calcareous earth" (see 2.6), and such ecological intelligence was at the heart of the agricultural revolution. During the same period the focus of the amateur botanist was becoming more precise and detailed. First records for new species were no longer sufficient: it was important to list as many localities as possible for each plant. This is abundantly clear in *A Flora of Shropshire*, which William Leighton published in 1841. It still forms the basis of our botanical knowledge of the county today. H C Watson encouraged the collection of detailed local records, particularly in his classic works *Cybele Britannica* (1847–1859) and *Topographical Botany* (1873), using the system of **vice-counties** which he had devised.

By 1913 (the planned but unfulfilled publication date of a second Shropshire Flora by Hamilton and others) the county was further subdivided for recording purposes into 'natural' landscape units based on the drainage basins of 13 rivers (see 2.12 and Lloyd and Rutter 1957). Perring and Walters's monumental *Atlas of the British Flora* (1962) introduced British botanists to the advantages of recording on the basis of the National Grid, using the 10km square as the basic unit. The present work, like many other local Floras during the past two decades, uses the tetrad, of which there are 25 in a 10km square.

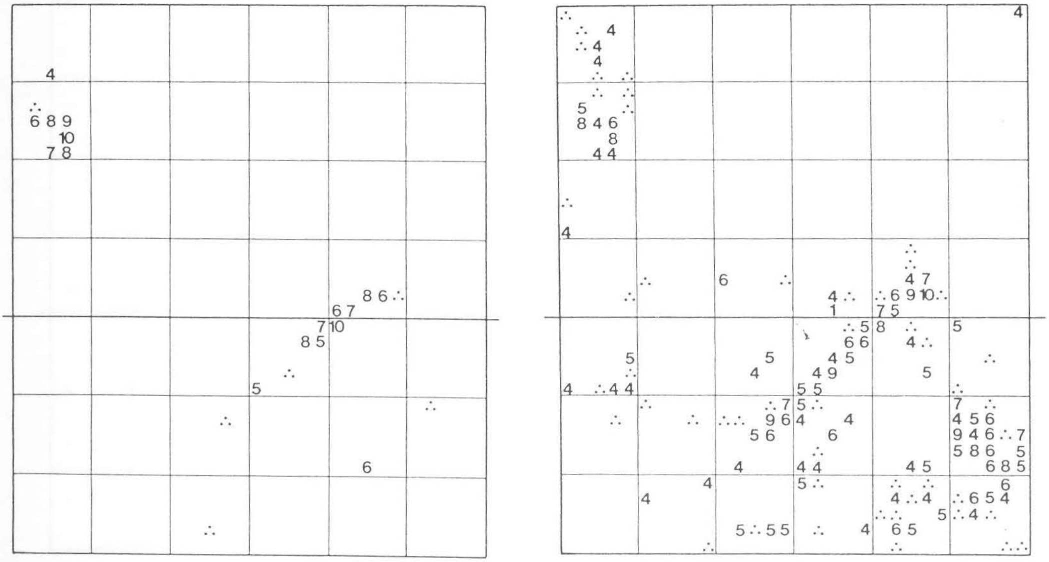
Records in Leighton's Flora are understandably more numerous in the area around Shrewsbury than in remoter parts of the county: botanists, in Leighton's day, were still fairly thin on the ground. Knowledge of the local natural history continued to increase through the second half of the nineteenth century, and with it the total number of plant species recorded in the county. Gains, including newly-arrived **adventives** as well as newly-discovered natives, outnumbered losses through extinction at least until the First World War and possibly as late as the Second (but see Perring 1970).

Interest today is not just in the record for its own sake, but also in the factors which determine why a particular plant grows in one place and not in another. The 12 distribution maps which make up Fig. 3.1 were chosen to illustrate this point. The last of them, that for pink purslane, shows a plant thought still to be spreading: the sites which it now occupies are of course suitable for it, but it does not yet occupy all suitable sites. The other maps on the page show the more or less long-established distribution patterns of selected native species, each determined by a combination of various factors in the physical and biotic environment and the vicissitudes of human activity. Yellow-wort is a good example to look at. The map for this species shows two common features: a distinct clustering of dots in particular parts of the region, and a more open scatter of single dots elsewhere. The clustering may be seen, in the jargon of the communications industry, as the 'signal' that the plant is favoured by particular environmental conditions – in this case, the presence of outcrops of pure limestone in open habitats with only thin soil cover; the scattered sites, more or less remote from the main limestone outcrops, are the 'noise' representing the chance occurrence (or discovery) of the plant in places such as limekilns or canal towpaths where calcareous soils occur.

A glance at the published geological maps of the region reveals the outcrops of Carboniferous Limestone (chiefly in the Oswestry uplands) and of Silurian limestones between Ironbridge and Ludlow. We do not need the evidence of plant distribution maps to know where limestone rocks occur at the surface. Or do we? The fact that yellow-wort records are frequent along the north-eastern part of Wenlock Edge but thin out as one moves south-westwards suggests that not all limestones are equal. It was in fact pointed out in Chapter 3 that the Wenlock Limestone is a pure reef limestone near Much Wenlock, but becomes very impure and 'rubbly' towards Craven Arms; the almost parallel scarp of the Aymestry Limestone to the southeast shows a reverse trend.

It may therefore be of some interest to use a method which enhances or intensifies the 'signal' while diminishing the irrelevant 'noise'. A selection of several species, all known to be favoured by shallow, calcareous soils in open sites, can be plotted together on a **coincidence map** in which the number of species recorded for a tetrad is indicated, irrespective of which actual species from the group are present at any particular point. Fig. 9.1a is a coincidence map for 12 species of calcicole. Tetrads in which four or more of the species coincide are shown by the appropriate numeral, those with three by small dots. The image enhancement is striking. Comparison with the small geology map (Fig. 3.2d) shows the close correlation with limestone cliffs and quarries.

This is a particularly obvious instance, whose result may hardly justify the effort. If we take, however, a group of 14 species known to occur in old mixed woodland on calcareous or other base-rich soils, and plot them in the same fashion, a more interesting pattern emerges (Fig. 9.1b): not only do the high-

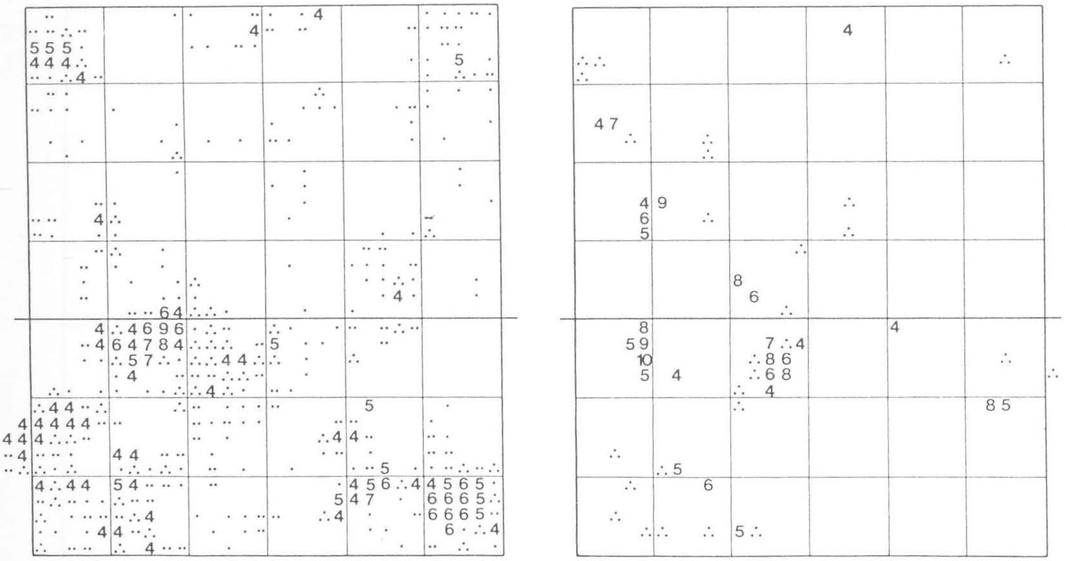


(a) Limestone quarries and other open sites on dry calcareous soils

Acinos arvensis
Anacamptis pyramidalis
Blackstonia perfoliata
Cirsium eriophorum
Desmazeria rigida
Gentianella amarella
Helianthemum nummularium
Inula conyza
Neottia nidus-avis
Ophrys apifera
Platanthera chlorantha
Sanguisorba minor

(b) *Old woodlands on base-rich soils*

Campanula trachelium
Carex strigosa
Epipactis helleborine
E. purpurata
Festuca altissima
Hordelymus europaeus
Lathraea squamaria
Listera ovata
Orchis mascula
Paris quadrifolia
Sorbus torminalis
Tilia cordata
Vicia sylvatica
Viola reichenbachiana



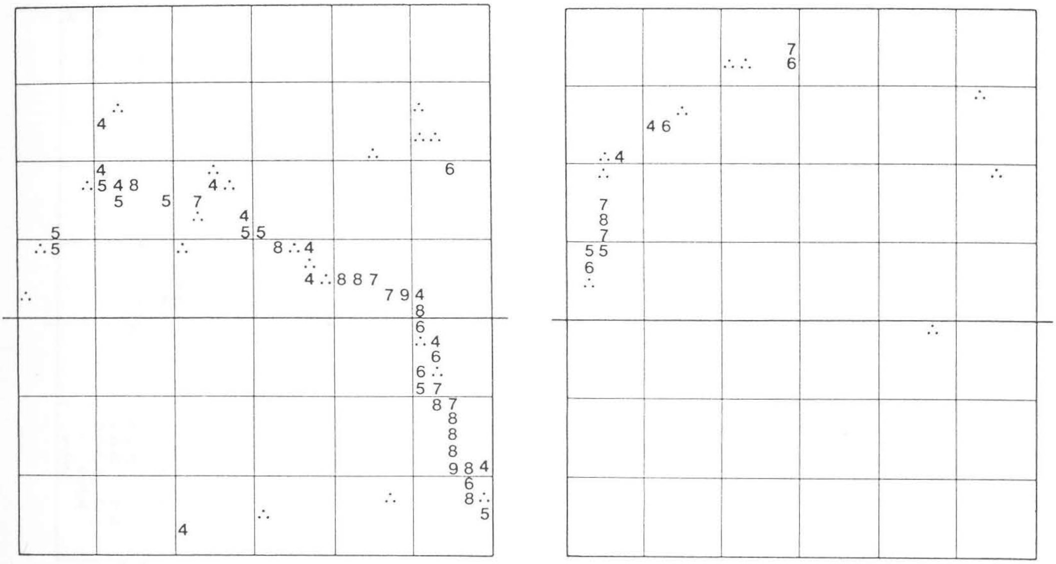
(c) *Dry heath and acid heathy woods* (tetrads with only one or two records also shown to demonstrate method)

Blechnum spicant
Carex pilulifera
Empetrum nigrum
Erica cinerea
Genista anglica
Lycopodium clavatum
Melampyrum pratense
Nardus stricta
Polygala serpyllifolia
Vaccinium myrtillus
V. vitis-idaea

(d) *Warm rocky slopes*

Aira caryophyllea
Cerastium semidecandrum
Dianthus deltoides
Filago minima
Jasione montana
Lepidium heterophyllum
Moenchia erecta
Ornithopus perpusillus
Sedum forsteranum
Spergularia rubra
Teesdalia nudicaulis
Trifolium striatum

Fig. 9.1 *Coincidence maps for some dry habitat types*

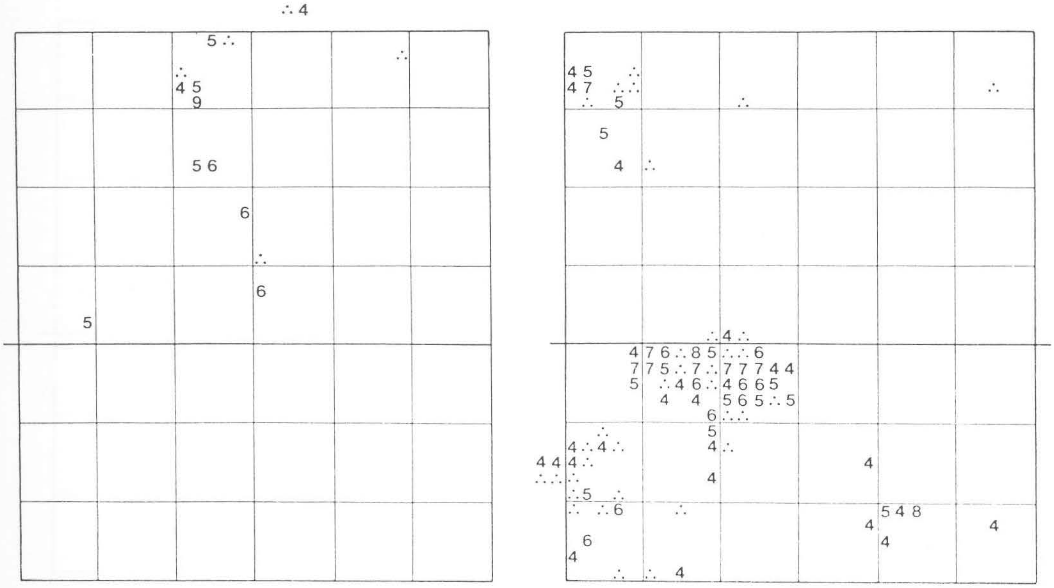


(a) *Rivers and their banks*

Brassica nigra
Carex acuta
Impatiens glandulifera
Myriophyllum spicatum
Potamogeton pectinatus
P. perfoliatus
Ranunculus fluitans
Salix purpurea
S. triandra
Tanacetum vulgare

(b) *Canals, disused but still holding water*

Callitriche hermaphroditica
Ceratophyllum demersum
Hydrocharis morsus-ranae
Lemna polyrhiza
Potamogeton alpinus
P. compressus
P. friesii
P. obtusifolius
P. praelongus
Ranunculus circinatus



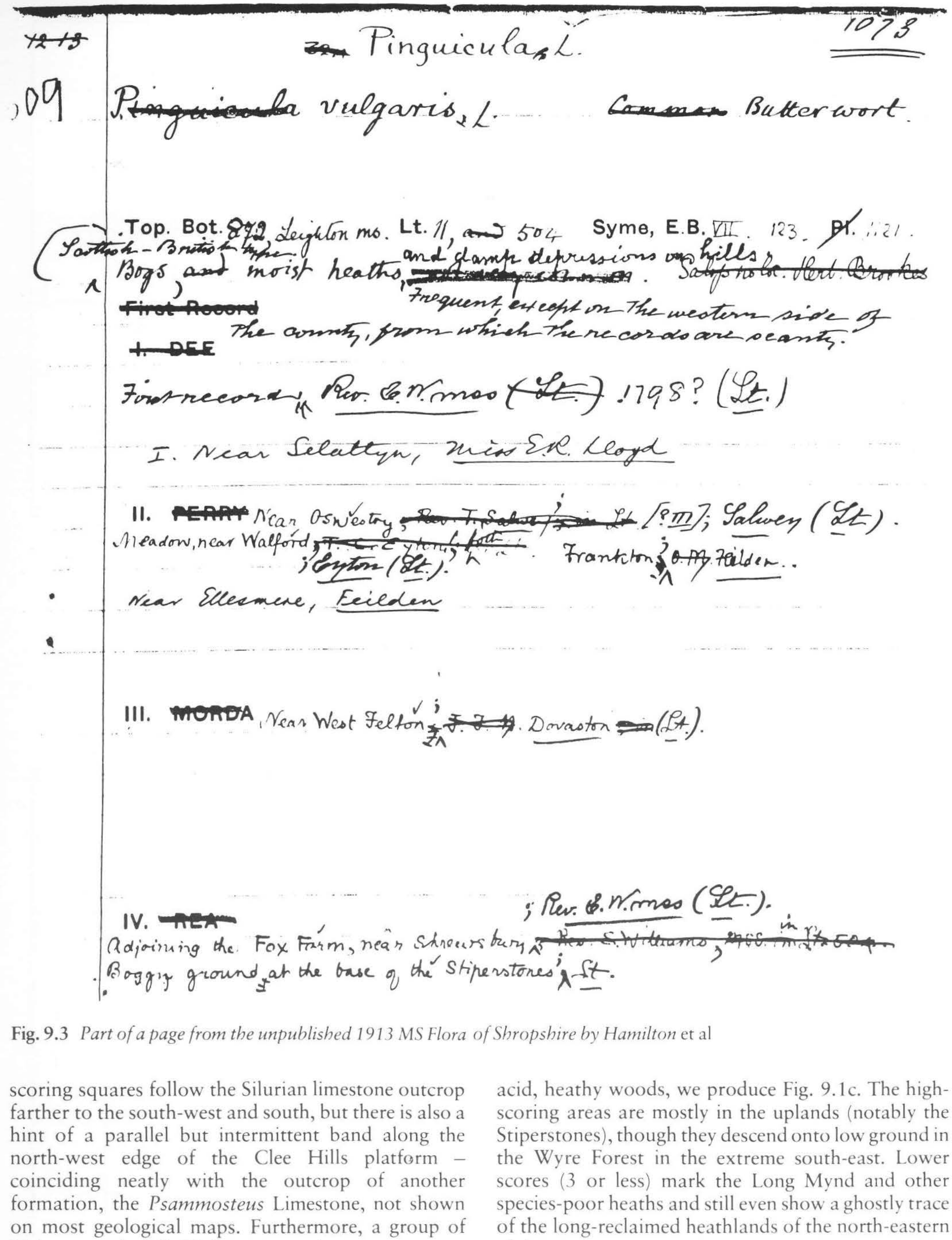
(c) *Meres, reedswamp and alder carr*

Calamagrostis canescens
Carex elata
C. elongata
Cicuta virosa
Cladium mariscus
Ranunculus lingua
Schoenoplectus lacustris
Thelypteris thelypteroides
Typha angustifolia
Zannichellia palustris

(d) *Hill-springs, flushes and valley mires*

Anagallis tenella
Carex hostiana
C. pulicaris
Dactylorhiza maculata
Eleocharis quinqueflora
Hypericum elodes
Montia fontana
Myosotis secunda
Pedicularis palustris
Pinguicula vulgaris
Ranunculus omiophyllus
Scutellaria minor

Fig. 9.2 *Coincidence maps for some wet habitat types*



~~12 13~~ ~~[illegible]~~ Pinguicula, L. 1073

,09 P~~inguicu~~la vulgaris, L. ~~Common~~ Butterwort.

(Scottish - British type) .Top. Bot. ~~872~~ Leighton ms. Lt. 11, ~~and~~ 504 Syme, E.B. VII. 123. ~~Pl.~~ 1121.
Bogs, and moist heaths, and damp depressions on hills, ~~[illegible]~~. ~~Salop [illegible] Herb. Brookes~~
~~First Record~~ Frequent, except on the western side of
~~I. DEE~~ the county, from which the records are scanty.

First record, Rev. E. Wms ~~(Lt.)~~ 1798? (Lt.)

I. Near Selattyn, Miss E. R. Lloyd

II. ~~PERRY~~ Near Oswestry, ~~Rev. T. Salwey; in Lt.~~ [? M]; Salwey (Lt).
Meadow, near Walford, ~~T. C. Eyton, [illegible]~~ ; Eyton (Lt.). Frankton; ~~O. M.~~ Feilden..
Near Ellesmere, Feilden

III. ~~MORDA~~, Near West Felton; ~~J. F. M.~~ Dovaston ~~[illegible]~~ (Lt.).

IV. ~~REA~~
Adjoining the Fox Farm, near Shrewsbury; ~~Rev. E. Williams, MSS. in [illegible]~~ ; Rev. E. Wms (Lt.).
Boggy ground at the base of the Stiperstones; Lt.

Fig. 9.3 *Part of a page from the unpublished 1913 MS Flora of Shropshire by Hamilton* et al

scoring squares follow the Silurian limestone outcrop farther to the south-west and south, but there is also a hint of a parallel but intermittent band along the north-west edge of the Clee Hills platform – coinciding neatly with the outcrop of another formation, the *Psammosteus* Limestone, not shown on most geological maps. Furthermore, a group of high scores in SO 78 draws attention to some very intriguing wooded ravines or dingles on lime-rich Upper Coal Measures soils. This map, then, is telling us something that we do not already know about the regional environment.

Applying the same technique to a group of 11 species which normally grow on dry heathland or in acid, heathy woods, we produce Fig. 9.1c. The high-scoring areas are mostly in the uplands (notably the Stiperstones), though they descend onto low ground in the Wyre Forest in the extreme south-east. Lower scores (3 or less) mark the Long Mynd and other species-poor heaths and still even show a ghostly trace of the long-reclaimed heathlands of the north-eastern plain.

Fig. 9.1d is more speculative, using a group of 12 species all of which are favoured by the micro-climate of warm, sunny, south-facing rocky slopes and by shallow soils which are neither lime-rich nor excessively acid. It is very unlikely that all 12 species would be found together: they do not usually 'belong'

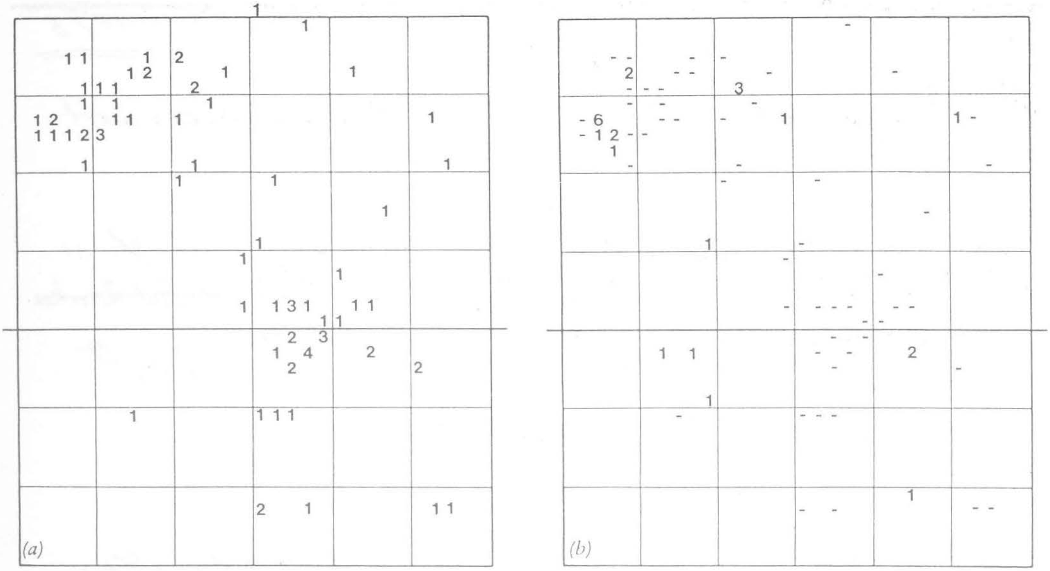


Fig. 9.4 *Coincidence maps (a) pre–1913 and (b) post–1969 for calcareous fens and mires*
†Blysmus compressus
Carex dioica
Crepis paludosa
Epipactis palustris
Eriophorum latifolium
Parnassia palustris
Samolus valerandi
Trollius europaeus

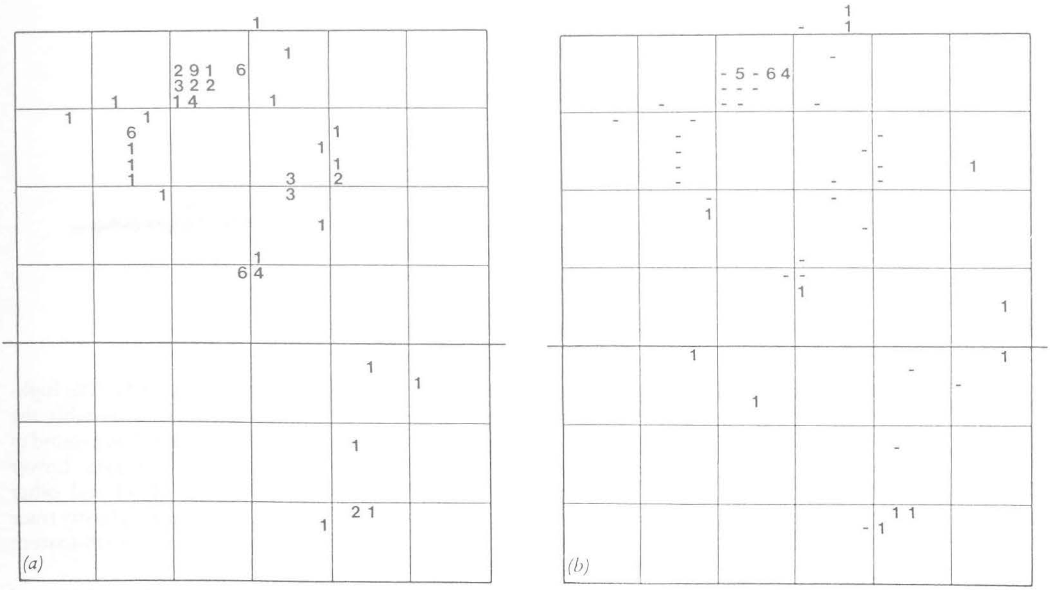


Fig. 9.5 *Coincidence maps (a) pre–1913 and (b) post–1969 for acid bogs and wet heaths*
Andromeda polifolia
Carex limosa
Drosera anglica
D. intermedia
Eleocharis multicaulis
Osmunda regalis
Rhynchospora alba
†Scheuchzeria palustris
Trichophorum cespitosum
Utricularia minor

to exactly the same communities. Nevertheless, on a tetrad basis, there is a distinct clustering in certain parts of the region where small steep hills of igneous rocks, volcanic ashes or hard Precambrian sediments are found (Fig. 3.2c). This map draws attention to some new and somewhat unexpected features: a sandstone outcrop beside the Severn Valley Railway south of Bridgnorth, for example, and the broken-up concrete runway of a former airfield on Whitchurch Heath (see Chapter 8).

Coincidence maps for wet habitats may also be useful. Fig. 9.2a is based on a selection of species associated with larger rivers and their banks. Some are aquatic plants growing in the river itself; others are members of the scrub and tall herbaceous communities on the damp but fertile banks. They are not, therefore, 'associates' in the conventional sense at all. The fact that they occur within the same 4km^2 reflects their dependence on some aspect of that complex geographical phenomenon, a river. Two further features of this map may be noted: the gaps in the pattern in the upper reaches of the river, which are both relatively inaccessible and under-recorded; and the tendency for the scores to increase in a downstream direction in the Lower Severn Valley, suggesting an unexpected increase in species diversity.

Fig. 9.2b is based on a group of species associated with the still but nutrient-rich waters of disused reaches of canal. That these are now broken up into isolated lengths and will never again be continuously navigable is clear from the map, which also suggests interesting variations in species-richness from one reach to another.

Fig. 9.2c uses another group of disparate species – aquatic, fen and swampy woodland plants – which together form a useful indicator group for true meres as distinct from ornamental pools, reservoirs and so on.

Fig. 9.2d uses species that pick out those parts of the uplands west of Oswestry, the West Central Hills, Clee Hills and Clun Forest where hill-springs rise. The Long Mynd, Stiperstones and Corndon Hill stand out as particularly rich areas.

It is worth taking a single species from this group, common butterwort (*Pinguicula vulgaris*), and looking at its distribution more closely. A page from the unpublished manuscript of the 1913 Flora (Fig. 9.3) reveals a number of lowland records in places where the plant has long been extinct. This suggests a further use of the coincidence map: the comparison of present-day records with those that can be relied upon from earlier generations of botanists.

Fig. 9.4 takes a group of uncommon species usually found in calcareous fens and mires. Fig. 9.4a is based on all records for these species given by Leighton (1841) and by Hamilton *et al* (1913). They were well scattered in the north-west and central south-east areas, with a distinct line along the foot of Wenlock Edge. Fig. 9.4b shows the records made for the same species in the current survey: one site in SJ 22 has an increased score of 6; almost all the others show decreases or losses. One species is extinct.

Fig. 9.5 presents the same treatment for a group of uncommon plants of acid bogs and wet heaths. The losses are even more severe: a site which scored 9 out of 10 in the earlier period is now reduced to 5; again one species has become extinct. The highest current score is 6, on a site in SJ 43 which would have been treated as part of a larger area, Whixall Moss, in the past.

It is when we turn to oligotrophic (nutrient-poor) lakes and pools that the picture is gloomiest (Fig. 9.6). Scores of 7, 8 and even 9 out of 12 are seen on the earlier map. The highest current score is 4, and at only one site; no other site exceeds 2. No less than four species are extinct or probably so. The losses in this group are partly the result of inevitable improvement in land drainage, but they also reflect other, perhaps more insidious, changes. Several of the high-scoring sites on the older map are meres which have since become more eutrophic (nutrient-rich). This eutrophication seems to be part of a general tendency by no means confined to wet habitats in this region. It is also significant along hedgerows and roadside verges, where it is almost certainly attributable to the use of fertilisers on adjacent land (Sinker *et al* 1979; see also Trist 1970).

Following the clues given by coincidence maps, we can return to the primary sources for more detailed information. In the case of the North Shropshire meres it is instructive to compare the pre-1841 records given by Leighton for aquatic and mire species at one or more named meres with those made during a recent (1980) Meres Survey carried out by the Nature Conservancy Council. Of 55 species recorded by Leighton at Bomere Pool, 13 were also seen by the NCC surveyors: equivalent figures for other meres include 27:6 at Cole Mere, 31:6 at Ellesmere (The Mere), and 39:11 at Hencott Pool; the average re-recording rate is only 24%. Many of the losses are plants of oligotrophic lakes (e.g. *Isoetes lacustris, Lobelia dortmanna*) or acid peat bogs (e.g. *Carex limosa, Scheuchzeria palustris*). After making allowance for the different aims, methods and duration of recording, there is still clear evidence of profound ecological changes (see also Chapter 4).

A very few botanically important 'natural' sites in Shropshire seem to have been unknown to Leighton (e.g. Brown Moss), or inadequately studied in his day (e.g. Catherton Common). A much greater number of valuable sites familiar to him and his contemporaries have since 'disappeared' floristically, for the most part as a result of agricultural improvement (Fig. 9.7). A special case is Shawbury Heath, part of which was converted to an airfield during World War II and the remainder drained and afforested or reclaimed for farming. Table 9.2 shows some of the species recorded in Leighton's Flora for this and 11 other localities, all now floristically impoverished.

A word or two may now be appropriate about the uses and limitations of the coincidence map, though this is not the place for a detailed and critical account.

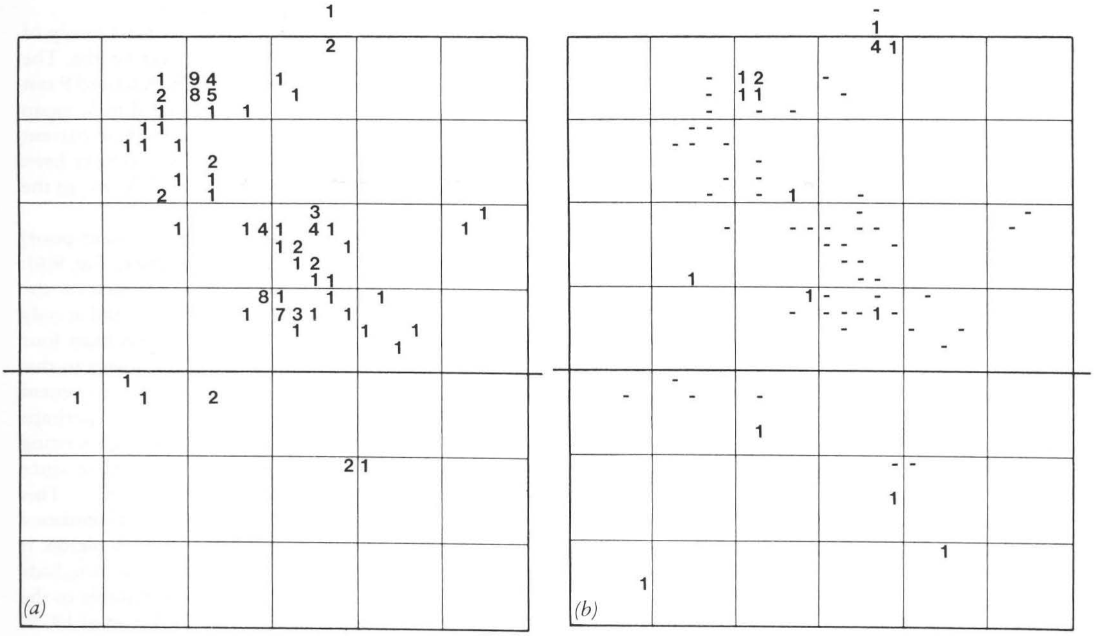


Fig. 9.6 *Coincidence maps (a) pre–1913 and (b) post–1969 for oligotrophic lakes and pools*

Apium inundatum
Baldellia ranunculoides
†Damasonium alisma
Elatine hexandra
Eleocharis acicularis
Eleogiton fluitans
†Isoetes lacustris
Littorella uniflora
†Lobelia dortmanna
Luronium natans *(omitting recent canal records)*
Nuphar pumila
†Pilularia globulifera

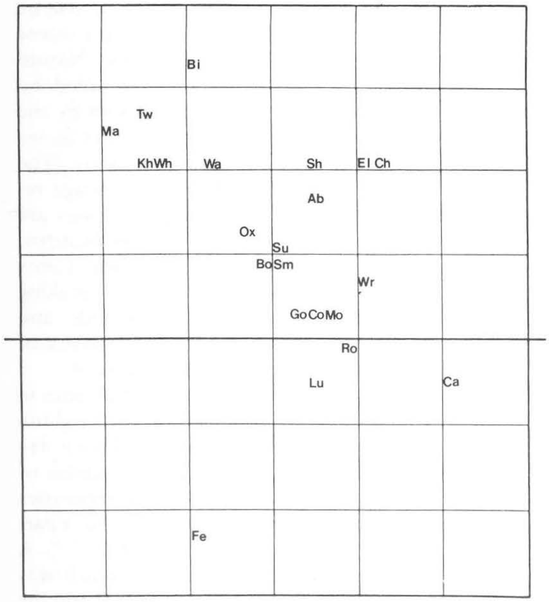


Fig. 9.7 *Some sites of botanical interest mentioned by Leighton (1841) but subsequently 'lost' through reclamation and agricultural or other developments*

Ab	Abery Wood (Ebreywood)
Bi	Birch and Lee, bogs about
Bo	Bomere Pool, bog on W or S side
Ca	Canton Rough (Cantern Brook)
Ch	Cold Hatton Heath, Moss, bog
Co	Cound Moor
El	Ellerdine Moss
Fe	Felton Farm
Go	Golden or Golding Pool
Kh	Knockin Heath and Dovaston
Lu	Lushcott, field by side of road from Lutwyche to Kenley
Ma	Maesbury
Mo	Mosterley
Ox	Oxon Pool
Ro	Rowley
Sh	Shawbury Heath
Sm	Shomere Moss
Su	Sutton and Weeping Cross
Tw	Twyford Vownog
Wa	Walford bog, meadow
Wh	Wolf's-head Turnpike
Wr	Wrekin, bog on SW side

It is primarily a device for sharpening and intensifying the presentation or demonstration of patterns of spatial correlation. Its effectiveness depends on the careful selection of species to produce such a pattern when their distributions are superimposed. To do this they must have enough common ground, ecologically and geographically, to overlap and reinforce one another over the greater part of their local range. They must also, on the evidence of field observations, be thought to be associated with the habitat type, habitat complex or environmental factors which it is desired to emphasise. A selected species must not be so rare

Table 9.2 *Some records in Leighton's (1841) Flora for 12 botanically interesting sites in Shropshire subsequently 'lost' through reclamation and agricultural or other developments*

A: AberyWood (Ebreywood), near Astley
B: Birch and Lee moors, near Ellesmere
C: Canton Rough (Cantern Brook), near Bridgnorth
E: Ellerdine Moss, near Waters Upton
F: Felton Farm, near Ludlow
H: Cold Hatton Heath and Moss, near Waters Upton
K: Knockin Heath, Dovaston and Wolf's-head
M: Mosterley and Cound Moor
R: Rowley, near Harley
S: Shawbury Heath
T: Twyford Vownog, near West Felton
W: Walford, near Baschurch

Anagallis tenella	FRW	*Hottonia palustris*	TW
Andromeda polifolia	BEH	*Hypericum elodes*	KSW
Apium inundatum	AKS	*Hypochaeris glabra*	K
Baldellia ranunculoides	S	*Isolepis setacea*	S
Carex binervis	S	*Luronium natans*	ASW
C. dioica	MR	*Lythrum portula*	HS
C. hostiana	MS	*Moenchia erecta*	AK
C. limosa	B	*Myrica gale*	BTW
C. pilulifera	S	*Narthecium ossifragum*	BT
C. pulicaris	R	*Ophrys insectifera*	R
Cicuta virosa	K	*Ornithopus perpusillus*	K
Cirsium dissectum	S	*Parnassia palustris*	CFMR
Cladium mariscus	T	*Pinguicula vulgaris*	MRW
Coeloglossum viride	R	*Potamogeton alpinus*	K
Dactylorhiza incarnata	S	*P. polygonifolius*	ST
Damasonium alisma	A	*Radiola linoides*	S
Drosera anglica	T	*Rhynchospora alba*	T
D. intermedia	HT	*Salix nigricans*	S
Eleocharis multicaulis	S	*S. repens*	S
E. quinqueflora	MS	*Senecio sylvaticus*	S
Epipactis palustris	CM	*Teesdalia nudicaulis*	K
Eriophorum angustifolium	ERSW	*Trichophorum cespitosum*	ST
E. latifolium	M	*Trifolium arvense*	K
E. vaginatum	EFT	*Triglochin palustris*	CMRS
Erodium cicutarium	K	*Trollius europaeus*	W
Filago minima	HK	*Utricularia minor*	K
Frangula alnus	MT	*U. vulgaris* agg.	T
Genista anglica	ST	*Vaccinium oxycoccos*	HK
G. tinctoria	RW	*Valeriana dioica*	RW
Gymnadenia conopsea	M	*Viola lutea*	K

(one or two records only) that its information content is negligible, nor so frequent that it swamps the signal. Coincidence mapping demands no prior belief in the 'reality' of associations or other discrete phytosociological units. It is, on the contrary, an empirical tool whose success is best tested by use. Given the complexity of real plant distributions, moreover, it seems unlikely that the technique could be used to generate false or imaginary patterns by the choice of uncorrelated species, but this is unproven.

9.3 Conservation in a changing landscape

The conservationist and the farmer or landowner are alike in being children of their time. The attitudes, decisions and actions of each are governed to a large extent by contemporary fashions and factors, including the hard artificial economics of the EEC. This makes it difficult for them to step back and see their responsibilities as part of a continuous story of stewardship in a landscape which has always changed and will continue to change. It is very difficult to find an objective basis for the arguments and counter-arguments in the conservation debate. Nevertheless, it is surely worth spending a little time in comparing the factual evidence on the distribution and frequency of plants and animals at particular stages in the recorded past with that at the present day. We can then better evaluate conservation priorities such as the relative urgency of protecting an acid pool or a base-rich mixed woodland. We should also find the humility as well as the time to consult the views of some of our predecessors.

> "It must be owned, a great deal of beauty is often spoiled by enclosures; and it seems a pity to lose scenes of pure Nature, in a country so artificial as that of South Britain. This applies chiefly to very large wastes, for instance Clun forest . . . is a fine specimen of smooth and extended turf, with every variation of swelling banks and retired dingles; but when it is considered how little profit is produced to those who have a legal right to these wastes, or to the public at large; what a scope is given to industry by their enclosure; and that the population of this country seems to require an extended cultivation, the latter motives must preponderate."

> "Though every proprietor should preserve or raise timber in proportion to the size of his domains, yet I am no friend to trees in hedge-rows. They hurt the fence; the fall of the leaf injures the late grass, and somewhat taints the sweetness of butter made at that time of the year; they are of little value as timber, from the difficulty of preserving them from the axe or pruning-hook; and they prevent a lofty hedge, which is better shelter, and which is some protection from trespass by hunting; an evil of little consequence where the country is slightly cultivated, but a very serious one in districts of improved farming."
>
> "There are several large mosses in Shropshire, and a very great number of smaller ones – with respect to large mosses, there can be no doubt of the propriety of draining and improving them, as the extent is sufficiently great to pay the expense of a main-cut or level; but the same does not hold good as to the smaller, as they are frequently situated in hollows, surrounded on all sides by high land, so that it is next to impossible to take the water from them, unless at an expense exceeding the value of the land when so improved. The drainage of these mosses must therefore be guided by circumstances."

If Archdeacon Plymley believed the country of South Britain to be "artificial" at the end of the eighteenth century, what would he think of it today? The Long Mynd is one of the few "very large wastes" still surviving as common pasture, and most of his "large mosses" have indeed been drained and reclaimed. Even the smaller mosses, in their enclosed hollows, have fallen victim to the demands of a more wasteful generation, which can fill an entire kettle-hole (Weeping Cross, Shrewsbury) with its domestic rubbish in less than ten years.

The nineteenth century, however, was hardly an age of environmental enlightenment. Landowners as interested in the protection of nature as the Dovastons, father and son (see 2.7), were few. The naturalists themselves were often foremost among the threats to rare species: ornithologists shot birds in order to identify them, and botanists collected all the specimens they could see of a scarce plant for their exchange value. Oswald (1976) suggested that the "species decline in Shropshire" could be attributed at least in part to such enthusiastic collecting, supporting his claim with quotations from several authors including Blunt (1912), who earnestly requested:

> " all residents and visitors . . . to do their utmost to discourage the wanton destruction of these minor beauties of Stretton, and especially to abstain from purchasing wild plants of dealers and hawkers, and from carrying them away in quantities. Thirty years ago the beautiful Oak fern was plentiful in the Longmynd valleys. It has now disappeared and many another interesting or beautiful species is in danger of a similar fate."

Marston (1882) wrote earlier of the same fern that it grew "luxuriantly" on "the sides of the Longmynd hill valleys", but ended his account by saying: "It grows well on rock-work, for which it is very suitable if planted in a cool shady situation." Davies, writing in the same year as Marston, said that the royal fern "used to grow in great beauty and luxuriance" at Ellesmere, but continued: "whether here, as in many other places, it has become extinct through the modern rage for collecting ferns, I cannot say."

When we consider all the sources available to us, including soil surveys, descriptive writing (Leyland, Plymley etc; see 2.2 and 2.6), old maps, landscape paintings and even the recollections of those who remember a less mechanised age, the evidence is overwhelming that there has been a net loss in the area and diversity of semi-natural habitats.

The more direct evidence of botanical records confirms a consequential loss in the number and frequency of native plant species. It is no coincidence – or rather, in the special sense used in this chapter, it is a significant coincidence – that grass-of-Parnassus has declined from 24 localities to two during the period when Plymley's advice on the drainage of mosses and reclamation of wastes has been so thoroughly carried out. But if, as we have repeatedly asserted, the landscape is in a constant and ineluctable state of change, why should we worry about the incidental losses?

The conservationist is concerned about the nature and pace of change in two principal ways. The first stems from the effects of social and economic forces, with associated public attitudes, on our use or abuse of our total environment; it includes concern over pollution, consumption of non-renewable resources, population growth and a number of other important issues which are outside the scope of this book. The second is a more specific anxiety over the risks of total loss of particular **habitats**, which may or may not restore themselves given enough time; and of particular species or **genotypes** which, once lost, can never be re-created. Several species have already become extinct, at least in our region: the starfruit (*Damasonium alisma*) is on the verge of extinction in the British Isles as a whole (Perring and Farrell 1983). How much we mind about such losses is a matter for individual ethical judgement as well as scientific concern; but they are not trivial.

The 1950s and 1960s were the pioneering decades of nature conservation in Britain, witnessing the birth of most of the local voluntary conservation bodies (including the Shropshire Conservation Trust in 1962) and the early and somewhat haphazard notification of Sites of Special Scientific Interest. The 1970s and 1980s have seen a strengthening of the voluntary movement with, for instance, the establishment of over 20 nature reserves in Shropshire by the STNC. This period has also brought the first National Nature Reserve in Shropshire (the Stiperstones) and the publication of *A Nature Conservation Review* (Ratcliffe 1977) – the Domesday Book of the Nature Conservancy Council. There has been, at the same time, a significant growth of public awareness and concern over nature conservation issues. Very useful local surveys have been carried out, and reports produced, by the STNC on prime sites in Shropshire (1979–1980) and by the NCC on woods (1977), meres (1979–1980) and grasslands (1982).

These developments have taken place during a period of unprecedented intensification in the primary uses of rural land and water: forestry, industry and recreation as well as agriculture. Farming is of course the major land-use and the most freely criticised, but, as the admirable liaison work of the Farming and Wildlife Advisory Groups has shown, the person most ideally suited to further nature conservation is the farmer who is sympathetically aware of, and takes a pride in, the natural assets in his care.

At the beginning of this section we raised the question of conservation priorities. We can now claim that there is sufficient botanical evidence for at least a tentative ordering of habitats on the basis of data on species losses, habitat reduction, residual areas, and the nature and degree of threats. This order (Table 9.3) may be open to challenge on points of detail or on other grounds (e.g. zoological evidence), but Chapter 10 provides a substantial body of facts to meet such challenges. The table does not take account of conservation measures already in existence, such as the declaration of nature reserves or the negotiation of informal agreements with owners.

As the first steps in conservation, the need is widely recognised for network research (the simultaneous collecting of scientific data at a number of widely-separated localities), baseline surveys and the compiling of inventories of the natural assets or resources under our care (Walters 1970). This, rather than satisfying the curiosity and enthusiasm of a dedicated band of local botanists, was the underlying purpose of the 1970–1983 survey and of its publication as this *Ecological Flora of the Shropshire Region*.

Table 9.3 *Provisional schedule of conservation priorities in the Shropshire Region*

*** = risk of total loss of habitat type
** = risk of severe loss of area or number of sites
* = risk of loss of certain sites of particular interest

	Habitat or vegetation type	*Principal threats*
SITES OF CONSERVATION VALUE		
***	Oligotrophic pools	drainage, eutrophication and agricultural development
***	Wet and dry lowland heath	
***	Acid peat bogs	
***	Calcareous mires	
**	Hill-springs and valley mires	
**	Old lowland grassland	eutrophication, ploughing and reseeding
**	Old hill grassland and heath	
**	Clay-pits and disused canals	recreation or reclamation, rubbish tipping
*	Meres, fen and carr	
	Rivers, streams and ditches	pollution, dredging, engineering
*	Rock outcrops and screes	quarrying, afforestation
*	Old base-rich woods	felling and replanting or agricultural development
*	Old acid woods	
*	Parkland and ancient trees	
*	Hedges and verges	removal or intensive management
*	Commons and old scrub	lack of grazing, amenity management
*	Churchyards, golf courses, former military land	
SITES WITH CONSERVATION POTENTIAL		
	Quarries, sandpits and mine waste	restoration and amenity management, rubbish tipping
	Disused railways and waste land	
	Headlands and gateways of arable fields	weed control, intensive management
	Gardens, allotments, orchards	
	Derelict buildings	demolition or restoration

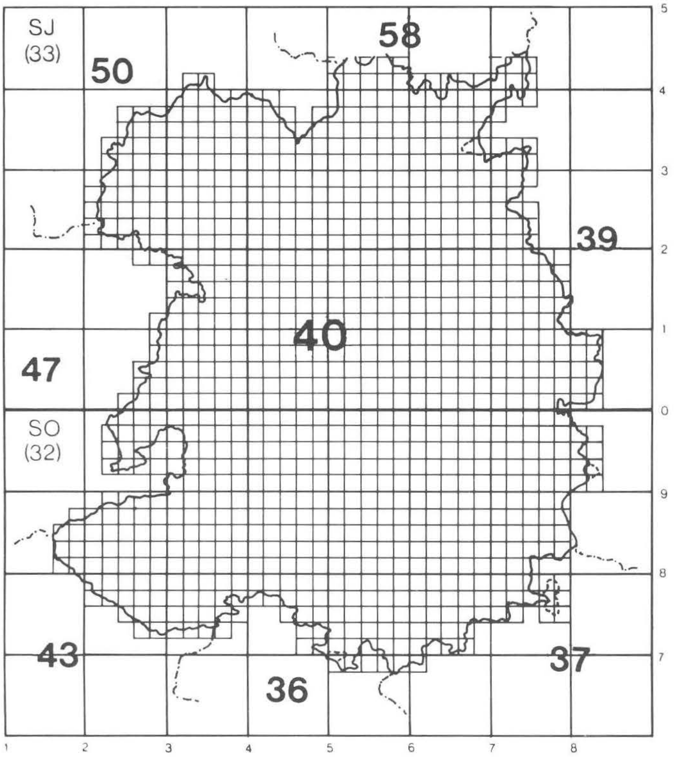


Fig. 10.1 *Vice-county 40 Shropshire and parts of neighbouring vice-counties: 36 Herefordshire, 37 Worcestershire, 39 Staffordshire, 43 Radnorshire, 47 Montgomeryshire, 50 Denbighshire and part of Flintshire, 58 Cheshire. The bold outline shows the administrative county of Shropshire and the dotted line the boundary of vice-county 40 where this differs from the administrative county. (With grateful acknowledgements to Dr J G Dony.)*

PART THREE
The Flora

'Tis spring; come out to ramble
The hilly brakes around,
For under thorn and bramble
About the hollow ground
The primroses are found.

A Shropshire Lad
A E Housman, 1896

Introduction

The final chapter of this book is an annotated catalogue and atlas of the vascular plants found growing in a wild state within the Shropshire Region. In these respects it bears some resemblance to an orthodox county Flora.

The choice of a vice-county together with its rectilinear frame as the recording territory for this Flora has already been explained in Chapter 1 and the Preface. Fig 10.1 shows v c 40 Shropshire in relation to the seven neighbouring vice-counties; it also indicates the comparatively minor differences between the boundary of v c 40 and that of the modern administrative county of Shropshire – recently, but happily not for long, known as Salop (the name also used by Watson for v c 40).

Care has been taken in the Flora to indicate where records for uncommon species lie just within, or just outside, v c 40. About 20 species found in the Shropshire Region, as here defined, do not occur in v c 40 at all. No native British plant is endemic to v c 40 alone (see Chapter 4).

While the territorial policy of this book is admittedly expansive, its chronological limits are restricted: almost all the solid black dots on the distribution maps relate to records made during the survey's 'time-slice' 1970–1983; the same applies to undated recent records in the text.

Maps are published here for 731 taxa (species, microspecies, subspecies, varieties and hybrids) included in the catalogue: not mapped were the commonest (A) species (see Chapter 1), rare species recorded in less than three tetrads, most planted aliens and a very few taxa for which the records were so uneven as to be misleading. 104 of the 731 are historical maps, showing not only current (i.e. 1970–1983) records but also, with different symbols, records listed by Leighton (1841) and not seen since; those made by Hamilton *et al* up to 1913; and those which first appeared – and, in most cases, disappeared – during the period between 1913 and 1969. With a few chosen exceptions such as rosebay willowherb (*Chamerion angustifolium*), most of the historical maps are of species which have declined in frequency, sometimes to extinction. It is worth noting that the choice of 1970 rather than 1930 as in *Atlas of the British Flora* (Perring and Walters 1962, 1976, 1983) or *Flowering Plants of Wales* (Ellis 1983) for the threshold year emphasises the effects of recent changes in the landscape, especially those due to modern agricultural practices (see Chapter 9).

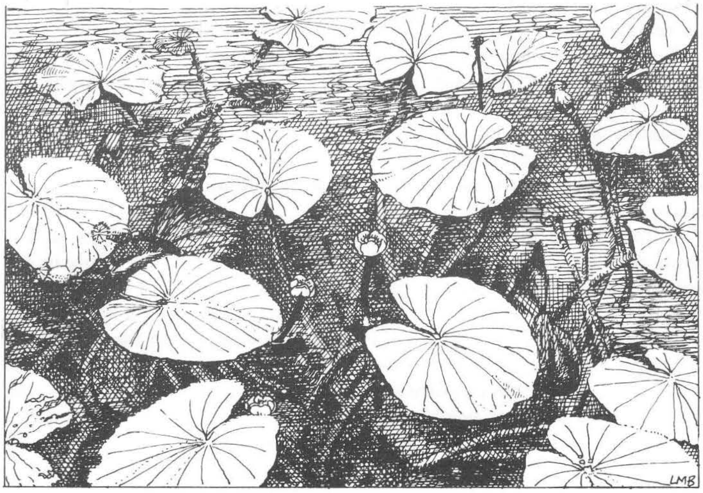
The systematic scope of the Flora and the reasons for not including (for instance) bryophytes were explained in the Preface. A pragmatic approach has been taken to the treatment of critical vascular plant groups, where the author-editors – most of whom are not taxonomists – can claim only limited expertise. We have relied mainly on the knowledge and helpfulness of specialists outside the region, both for records made on occasional forays into our territory and for determining critical material.

Much more arbitrary are the limits of inclusion in the wide grey area between wild and cultivated or planted species. Common exotic conifers used in forestry are in, especially if they can regenerate from self-sown seed; trees, shrubs and herbaceous plants which have escaped from gardens and successfully established themselves in such places as hedgerows, woods, pools and canals are in, too, as are many of the short-lived casuals which have come and gone since the publication of Lloyd and Rutter's *Handlist of the Shropshire Flora* in 1957. Cereals and other food-crops are excluded, together with most ornamental trees, alien garden weeds, and casuals last recorded before 1957: the Handlist, apart from a very few accidental omissions such as *Veronica filiformis*, provides a comprehensive list of Hamiltonian and post-Hamiltonian introduced species, and it seemed unnecessary to repeat these unless we had something useful and new to say about them. Dates of first records are given, where known, for introduced species which have become widely and successfully established. The equally interesting information about the date when a declining species was *last* seen is, unfortunately, seldom available.

Herbaria and the more inaccessible corners of the botanical literature have not been vacuum-cleaned in a quest for lost or overlooked records: effort in the current survey has been concentrated on collecting and processing the mass of field data, both geographical and ecological. The vast majority of the records were made by amateur botanists working in their spare time, often in unfamiliar squares remote from their homes. Some were only able to examine one quarter (1km^2) of each tetrad; others managed to scrutinise their squares with astonishing thoroughness, and their assiduity is forever inscribed in the blacker quadrangular patches on some of the distribution maps. A survey of this kind, however thoroughly executed, gathers no more than a limited sample of the information on the ground. The fact that patterns repeatedly emerge, in which the distribution of a species can be correlated with that of an environmental feature or factor, shows that an ecological 'signal' is coming through loud and clear over the 'noise' of random observation and occasional uncertainties of identification (see Chapter 9). Unexpected records have of course been checked, and doubtful ones eliminated.

The chief respect in which the Flora differs positively from most others is the amount of space devoted to information about the ecology and typical associates of the plants dealt with. This reflects the interests of the authors in general; it also derives from the deep influence on one of us (CAS) of a remarkable book – Professor Dr Erich Oberdorfer's *Pflanzensoziologische Exkursionsflora* (4th edn. 1979), originally written to cover southern Germany but immensely useful in other parts of western Europe including the British Isles. The format and style of Chapter 10 owe much to Oberdorfer; the content is an entirely Anglo-Welsh responsibility.

10 Vascular plants and their distribution



Yellow water-lily Nuphar lutea

10.1 SOURCES OF NOMENCLATURE

The systematic order and Latin nomenclature of vascular plants are those used in the third edition of *Excursion Flora of the British Isles* (Clapham, Tutin and Warburg 1981) except for a few exotic species and some subspecific taxa not included in that work.

Names of bryophytes given in lists of associates are from the second edition of *British Mosses and Liverworts* (Watson 1968).

Names of lichens are from an *Introduction to British lichens* (Duncan 1970).

Names of algae and 'blue-green algae' (Cyanobacteria) in the meres are those used by Reynolds (1978).

Binomial hybrid names are from Stace (1975).

The first English name given for each species is from *English Names of Wild Flowers* (Dony, Perring and Rob 1980). Other widely used alternatives are also given in many cases.

Vernacular names are mostly from the *Shropshire Word-book* (Jackson 1879), but a few are from Leeke (1938, 1939) or are based on the personal investigations of Joyce Roper, who has been collecting local names in south-west Shropshire.

10.2 ARRANGEMENT AND PRESENTATION OF INFORMATION

10.2.1 The accepted **English name**, printed in bold type, begins each new entry, followed by English synonyms, if any.

10.2.2 Vernacular names, if any, are given in single quotation marks.

10.2.3 The accepted **Latin name**, in bold type, is followed by the authority.

10.2.4 *Latin synonyms*, if any, are in brackets and italic type, with authorities; they are mostly names used in the second edition (1968) of *Excursion Flora of the British Isles* or in Lloyd and Rutter's (1957) Handlist (*LRH*).

10.2.5 A distribution map, if any, is placed between the names of a plant and the ecological notes on it, or within the latter.

10.2.6 Ecological notes

The notes for each entry, except in the case of a few uncommon aliens and casuals, begin with a list of habitats or types of vegetation in which the species may be found, generally starting with the most typical. This leads into an abbreviated description of the soil, in which the **water regime** during the normal growing season, and variations at other times, are dealt with first: soils may be wet, moist, damp, dry, well-drained, poorly-drained, waterlogged, with a variable water table (winter-wet), liable to flooding, or with laterally mobile ground water; **soil texture** is mentioned if the species shows marked preferences: it may be rocky, stony (or of artificial material such as brick or concrete), sandy, loamy, or composed of silt, clay, mud or peat. These physical properties are dealt with rather differently in aquatic habitats.

'Nutrient' status and **base status** come next: available phosphate and nitrogen are considered together, using the abbreviation PN, which may be poor (i.e. deficient), med(ium), or rich; these values are relative rather than absolute for each habitat type – a 'PN poor' arable field might well have a higher anionic nutrient content than a 'PN med' cliff ledge. The availability of nutrient bases – cations such as calcium, magnesium and potassium – is given as base poor, med(ium) or rich; a base rich soil is not necessarily calcareous.

Soil reaction (**pH**) is roughly indicated by the following scale:

v(ery) acid	pH <3.5
acid	pH 3.5–5.0
mod(erately) acid	pH 5.0–6.5
neut(ral	pH 6.5–7.5
alk(aline)	pH >7.5 (used of waters)
or calc(areous)	pH >7.5 (used of soils with free $CaCO_3$)

Humus type is generally related to base status and soil reaction, but is only mentioned in special cases.

Microclimatic conditions favourable to the species are suggested by the terms sun (or sunny), ½ shade or shade; warm or cool; exposed or sheltered; particular limitations are also described, if known, such as sensitivity to drought, high summer temperatures or late spring frosts, or the need for a constantly humid atmosphere.

Information is given, where it is available and significant, on a range of **biotic factors** and on **reproductive strategies** (see Chapter 8): the susceptibility of the species to grazing by various animals, to conspicuous attacks by pests or parasites, to mowing, trampling, burning, ploughing and other forms of disturbance; its tolerance or otherwise of competition from vigorous or taller neighbours; its success as a pioneer species in open communities, especially of annual plants; the tendency to occur in extensive almost pure stands, or as solitary individuals – extremes of sociability; unusual modes of reproduction, or failure of the usual ones.

10.2.7 Associated species

In most of the entries, there is a short selective list, introduced by the letters Ass:, of **typical associates**, each of them a species which one might expect to find growing in the immediate neighbourhood of the species being dealt with, and usually of the same order of size. These lists are arbitrary as well as brief: some are based on individual site records made by a standard procedure, but the majority are drawn from the personal experience of the authors working in the region. The associates are chosen to represent a range of communities and habitat types in which the plant under consideration is known to occur locally; indeed, in cases where it shows a 'bimodal' pattern of distribution, two lists may be given. Members of a particular list do not necessarily share the same ecological requirements, nor would they all be found growing together. In general, therefore, the lists should not be taken to represent 'associations' in the phytosociological sense.

In the associate lists, vascular plant names are abbreviated, as on Biological Record Centre (*BRC*) recording cards, to five letters for the generic name plus three for the specific epithet: thus *Lycopodium clavatum* becomes *Lycop cla*. In the few ambiguous pairs of specific names, special abbreviations have been devised:

Carex auta (C. acuta)
Carex amis (C. acutiformis)
Carex pcea (C. panicea)
Carex pata (C. paniculata)
Resed ltea (R. lutea)
Resed lola (R. luteola)
Rumex aosa (R. acetosa)
Rumex alla (R. acetosella)

Note also that microspecies of *Taraxacum* Section Erythrosperma are here collectively represented by *Tarax lae (T. laevigatum)*.

Mosses, liverworts and lichens named in associate lists also follow *BRC* card convention in being abbreviated to 4+4 letters, e.g. *Dicr scop* for *Dicranum scoparium*.

Full names for all abbreviations will be found in the Index.

10.2.8 Geographical distribution

The frequency of the species in the region as a whole, or in specified parts of it, is indicated either by the term widespread (when the plant is found throughout the region) or by abundant, common, frequent (sometimes qualified by 'locally'), sparse, rare or very rare. These are relative rather than strictly quantitative adjectives, and it generally goes without saying that they apply in suitable habitats only.

Localities are given by name for the more uncommon species – those with less than about ten records in the region – unless it has been considered unwise to publish this information for conservation reasons. A full list of cited localities, with their locations and grid references, is given in the Gazetteer which follows Chapter 10.

In instances of particular interest, such as first or last records for increasing or declining species, dates are given together with the initials or name of the recorder or other source of information (see the list of abbreviations):

Italic capitals (*LFS*) are used for publications.

Bold capitals (**NMW**) are used for collections (see Herbaria).

Ordinary capitals (EDP) are used for people.

10.2.9 Subspecies, varieties, forms and hybrids

Recognised taxa below specific rank are dealt with at the end of an entry, as are distinct or unusual forms of a species which have been noticed in the region; hybrids with other species are similarly treated (a **nothomorph** is a distinct variant of a hybrid between two species). Additional maps are inserted where appropriate.

10.3 DISTRIBUTION MAPS

Maps are given for more than half the taxa included in the catalogue: the basis of selection has been explained in the Introduction to Part Three. The meanings of the symbols used on the historical maps are as follows:

● is used for records made during the period of the 1970–1983 survey (but note that some of the records in the peripheral Welsh and Staffordshire parts of the region may date from the period 1950–1969).
○ is used for records made between 1913 and 1970, but not seen since.
H is used for records in the unpublished MS Flora edited by Hamilton, but not seen since; there is some overlap with the previous group, because a few later records have been added to the MS.
L is used for records published in Leighton's 1841 *A Flora of Shropshire* but not seen since.

On the small number of historical maps showing an increase in frequency since the earlier studies, the symbols L and H take precedence over ● even where the species is known still to occur in that tetrad.

10.4 SYMBOLS AND ABBREVIATIONS

10.4.1 One or more of the following symbols may appear before or between the accepted Latin names of species, with the meanings indicated:

× is a hybrid.
* is thought to be alien in the British Isles as a whole, or native elsewhere in the British Isles but regarded as an introduction in the Shropshire Region.
† is extinct in the region, or probably so.
$ is absent from (or extinct in) v c 40 Shropshire, but has been recorded within the region in a neighbouring vice-county.

10.4.2 Abbreviations used in the text (for abbreviated Latin names of associates see 10.2.7 above):

agg	aggregate
alk	alkaline
Ass:	associates
c	circa
calc	calcareous
compet	competition
det	determined by
E	east
esp	especially
med	medium
mod	moderately
msp(p).	microspecies (plural)
N	north
neut	neutral
nm	nothomorph
NNR	National Nature Reserve
PN	phosphate and nitrogen
pp	pro parte
S	south
s l	sensu lato
sp(p).	species (plural)
s s	sensu stricto
ssp(p).	subspecies (plural)
SUC	Shropshire Union Canal
usu	usually
v.	very
var.	variety
v c	vice-county
W	west

10.4.3 Abbreviated references to sources of records (see also Bibliography):

ABF	Perring, F H & Walters, S M (1962, 1976, 1983) *Atlas of the British Flora.*
AFBI	Jermy, A C *et al* (1978) *Atlas of Ferns of the British Isles.*
CSABF	Perring, F H & Sell, P D (1968) *Critical Supplement to the Atlas of the British Flora.*
FPW	Ellis, G (1983) *Flowering Plants of Wales.*
HFS	Hamilton, W P *et al* (unpublished MS, 1913) *Flora of Shropshire.*
LFS	Leighton, W A (1841) *A Flora of Shropshire.*
LRH	Lloyd, L C & Rutter, E M (1957) *Handlist of the Shropshire Flora.*
RBF	Caradoc and Severn Valley Field Club. *Record of Bare Facts* for the years 1893–1944. Nos 1–52. Shrewsbury, 1894–1945.
RBEC	*Report of the Botanical Exchange Club of the British Isles* 1879–1946/47. Vols 1–13. Manchester, 1880–1948.
TCSVFC	*Transactions of the Caradoc and Severn Valley Field Club* for the years 1893–1972. Vols 1–17. Shrewsbury, 1894–1973.

10.4.4 Recorders' initials, in alphabetical order of surnames:

Mrs E A Ashwell (EAA)
Mr A P Bell (APB)
Mr K K Bell (KKB)
Mr P M Benoit (PMB)
Mr J Bingham (JB)
Mr I R Bonner (IRB)
Mrs M E Chadd (MEC)
Mr M C Clark (MCC)
Mrs M J Connell (MJC)
Mr D Daniels (DD)
Mrs K E Daniels (KED)
Miss H M Davidson (HMD)
Miss B Davies (BD)
Mrs P Dickerson (PD)
Mr E S Edees (ESE)
Mr T Edmondson (TE)
Mrs D M Evans (DME)
Mr F Fincher (FF)
Mr B R Fowler (BRF)
Miss M S Fuller (MSF)
Rev G G Graham (GGG)
Mr H Hand (HH)
Mr A T Herbert (ATH)
Mrs E Heywood-Waddington (EHW)
Mrs W E Hutton (WEH)
Mrs M J Ing (MJI)
Mrs L Johns (LJ)
Mr D H Kent (DHK)
Dr D L Kingham (DLK)
Miss V J Macnair (VJM)
Mrs T E Mitchell (TEM)
Mrs S M Nelson (SMN)
Mr A Newton (AN)
Mr P H Oswald (PHO)
Dr J R Packham (JRP)
Mrs P Parker (PP)
Ms C G A Paskell (CGAP)
Dr F H Perring (FHP)
Mr W V Prestwood (WVP)
Miss E D Pugh (EDP)
Mrs C Raikes (CR)
Mr G P Richards (GPR)
Mrs M E Roberts (MER)
Mrs J M Roper (JMR)
Mr R Rowe (RR)
Mr E M Rutter (EMR)
Miss K M Saville (KMS)
Mr P D Sell (PDS)
Mr H H Shephard (HHS)
Mr C A Sinker (CAS)
Mrs S Stafford (SS)
Mr A McG Stirling (AMcGS)
Mr D Stoves (DS)
Mr W A Thompson (WAT)
Dr A K Thorne (AKT)
Dr I C Trueman (ICT)
Mr S R Turner (SRT)
Mrs I M Vaughan (IMV)
Mrs M Wainwright (MW)
Mrs P H Waite (PHW)
Mr C Walker (CW)
Dr S M Walters (SMW)
Mrs J A Warren (JAW)
Mrs E A Williams (EAW)
Mr E Wolfe (EW)
Mrs P A Wolseley (PAW)
Mr R G Woods (RGW)

Note also the following abbreviated organisations:
Botanical Society of the British Isles (BSBI)
Nature Conservancy Council (NCC)
Shropshire Conservation Trust (SCT), later
Shropshire Trust for Nature Conservation (STNC)

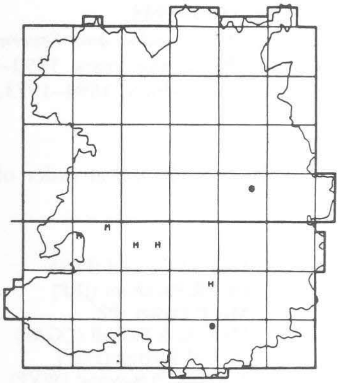
Footnote:

A few late records have been added to the text, but not to the maps, at proof stage.

Pteridophyta
Lycopsida

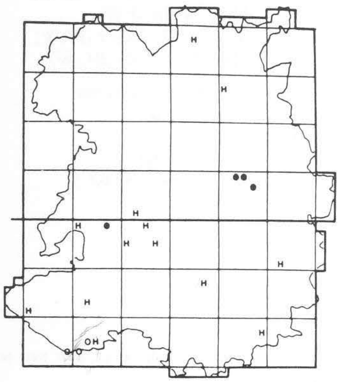
CLUBMOSS FAMILY
LYCOPODIACEAE

Fir clubmoss
Huperzia selago (L.) Bernh. ex Schrank & Mart.
(*Lycopodium selago* L.)



Crevices between stones on bare hilltops and in block scree, also found in lately abandoned opencast clay workings, on thin organic soils, damp to summer-dry, PN poor, base poor, v. acid to acid, sunny, exposed, with low compet in mainly moss- and lichen-dominated communities, usu solitary. Ass: *Agros cap, Crypt cri, Gymno dry, Hypoc rad, Clad fimb, Rhac lanu, Poly pili.*
V. rare: recently rediscovered on Titterstone Clee blockfield (1979 WVP and CW); one plant found, remarkably, on clay spoil at Stoneyhill near Coalbrookdale (1983 SJ Whild, ICT), where it must be a recent adventive. Formerly recorded on Stiperstones; Long Mynd; Stretton hills; Brown Clee. Decreasing, endangered.

Stag's-horn clubmoss
'Knives and forks'
Lycopodium clavatum L.



Heath, old pasture, woodland edges, track-sides, also in lately abandoned opencast clay workings, on damp to summer-dry soils, PN poor, base poor, v.acid to acid, sun to ½ shade, cool, sheltered, usu on open ground among heather or other taller plants. Generally on N-facing slopes or other partly shaded sites, but not so at Stoneyhill. Ass: *Agros cap, Blech spi, Callu vul, Hypoc rad, Luzul syl, Vacci myr, Dicr maju, Pleu schr, Rhac lanu, Clad* spp.
Rare: Perkins Beach, Stiperstones; The Ercall; Old Oswestry; hills near Bucknell; several young plants of recent origin found on clay spoil at Stoneyhill (1983 ICT).

Alpine clubmoss
Diphasiastrum alpinum (L.) Holub
(*Lycopodium alpinum* L.)
Recently abandoned opencast clay workings, on iron-rich stony clay with a thin superficial skin of organic matter, impermeable and winter-wet, PN poor, base poor, v.acid to acid, sunny, exposed among small grass tufts in open moss- and lichen-dominated communities with low compet, ungrazed. Ass: *Agros cap, Hypoc rad, Betul pen* (seedling). *Clad fimb, Camp intr, Cera purp, Pohl nuta.*
V. rare: many young plants, looking spontaneous and healthy, in at least twenty separate patches at Stoneyhill, no doubt recently adventive. Recorded by Littleton Brown on the top of the Stiperstones in 1726, but not reported anywhere in the region from then until its discovery as the third and most abundant clubmoss at Stoneyhill (1984 R Lamb et al, ICT).

LESSER CLUBMOSS FAMILY
SELAGINELLACEAE

Lesser clubmoss
†Selaginella selaginoides (L.) Link
Extinct. Formerly recorded from base-rich flushes on the Long Mynd, but not seen there for many years.

QUILLWORT FAMILY
ISOETACEAE

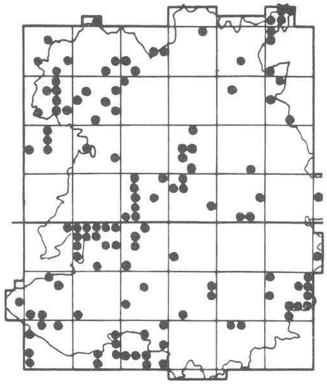
Quillwort
†Isoetes lacustris L.
Formerly recorded from pools on the Long Mynd and from Bomere Pool (where it survived until 1950s), now probably extinct.

Sphenopsida

HORSETAIL FAMILY
EQUISETACEAE

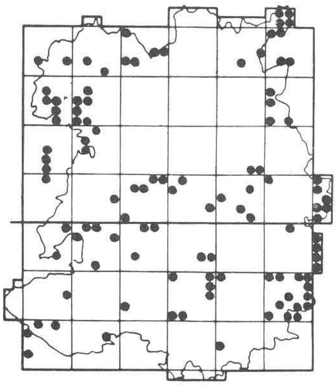
Dutch rush
$Equisetum hyemale L.
Not in Shropshire (v c 40). Damp area on steep bank of small stream in dense oak wood. Ass: *Vacci myr, Rubus fru.*
V. rare, refound 1979 by MCC and FF near Bewdley (v c 37).

Water horsetail
Equisetum fluviatile L.



Pools, canals and ditches in shallow standing water or on wet mud, PN poor to rich, base poor to rich, acid to neut or calc, sun to ½ shade, exposed or sheltered, generally in pure stands or in open areas between taller emergent plants. Ass: *Carex ros, Sparg ere, Alism pla, Potam nat, Phrag aus.*
Tolerates a wide range of nutrient conditions; unbranched form commonest in sunny exposed sites, branched form in shade.
Widespread in suitable habitats but rather sparse, commoner in the hills.

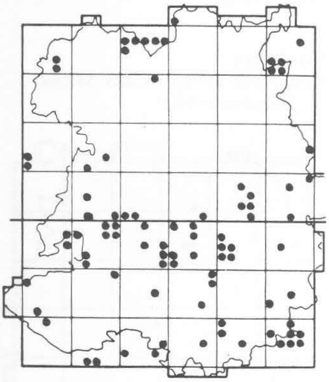
Marsh horsetail
Equisetum palustre L.



Margins of pools and ditches or in damp meadows, on moist to wet loam

or peaty soils, PN med, base med to rich, mod acid to calc, sunny, sheltered, mainly in herb-rich communities of old grasslands. Ass: *Festu pra, Cynos cri, Carex hir, Juncu inf, Lychn flo.*
Widespread but sparse, common in the hills but less so than water horsetail.

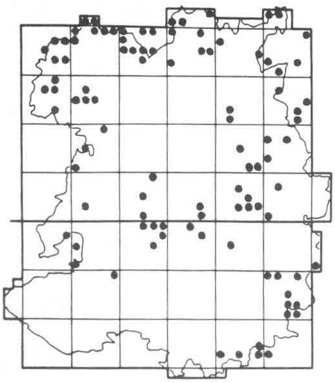
Wood horsetail
Equisetum sylvaticum L.



Woodland edges and glades usu in marshy ground or on stream banks, on damp to moist clay or loam, PN med to poor, base med, acid to neut, shade to ½ shade, sheltered, sometimes forming extensive pure stands. Ass: *Epilo pal, Angel syl, Cirsi pal, Juncu bul, Luzul mul, Stell als.*
Locally frequent in central Shropshire hills and SW, local and sparse in NW, absent from most of plain.

Field horsetail, Common horsetail
Equisetum arvense L.
Roadsides, tracks, field edges, rubbish tips and disturbed ground, generally on damp to dry clay, loam or stony soils PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. An aggressive pioneer and perennial weed esp on heavy soils. Ass: *Tussi far, Tarax off, Ranun rep, Centa nig, Dacty glo, Poa pra.*
Widespread and common throughout region except at highest altitudes. On shaded and sheltered hedgebanks, common horsetail sometimes develops secondary branches and looks like wood horsetail.

Great horsetail
Equisetum telmateia Ehrh.
Woodland edges and clearings in wet hollows, springs and seepages, often on waterlogged clay or shallow peaty moist soils, PN med to rich, base med to rich, mod acid to calc, shade to ½ shade, sheltered. Intolerant of trampling or grazing. Often in extensive pure stands. Ass: *Calth pal, Carex pen, Ranun rep, Epilo hir, Eupat can.*
Frequent in lowland, locally common on edges of uplands but absent from higher ground in S and W.
The hybrid with *E. palustre* (**E. × font-queri** Rothm.), previously known only from Skye, has been found on the canal bank near Queen's Head (1983 Busby).

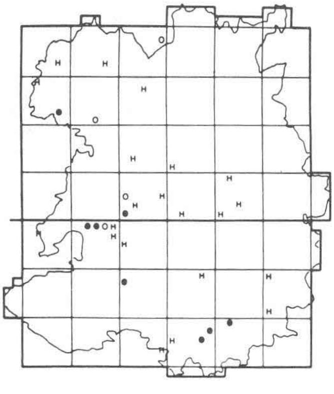


Filicopsida

ADDER'S-TONGUE FAMILY

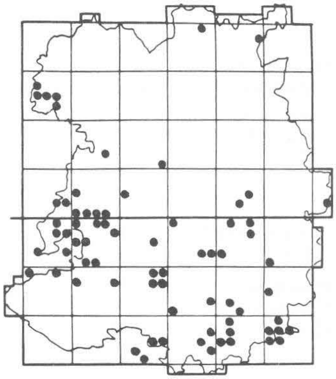
OPHIOGLOSSACEAE

Moonwort
Botrychium lunaria (L.) Swartz



Old pastures and grassy heaths, on dry to damp soils, PN poor, base poor to med, acid to calc, sunny, exposed. A small characteristic member of the species-rich community in grasslands (esp hill pastures), which have been manured and limed but not ploughed; also an occasional colonist of the older spoil tips from lead mines and dolerite quarries. Ass: *Viola lut, Festu ovi, Agros cap, Danth dec, Lotus cor, Polyg ser, Ophio vul.*
V. local and sparse but possibly overlooked: Central Shropshire hills; Oswestry uplands; Clee Hill. Less common than adder's-tongue. Decreasing through agricultural improvement.

Adder's-tongue
Ophioglossum vulgatum L.

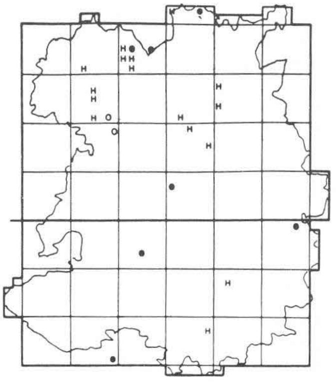


Old pastures, grassy heaths and clearings in scrub or woodland on dry to damp soils, PN poor to med, base poor to rich, acid to calc, sun to ½ shade. Characteristic of species-rich grassland or woodland edge communities, tolerant of heavy grazing, v. poor competitor in tall dense vegetation, often an indicator of unploughed land. Ass: *Primu ver, Lotus cor, Leuca vul, Linum cat, Alche fil.*
Sparse to locally frequent in western hills and throughout S of region. Decreasing, but much commoner than authors expected.

ROYAL FERN FAMILY

OSMUNDACEAE

Royal fern
Osmunda regalis L.

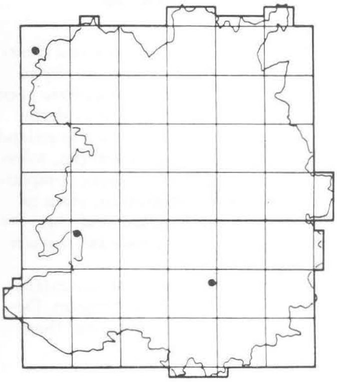


Open birch scrub or alder wood, on peat bogs on damp to wet soils, PN poor, base poor, v. acid to acid, deep peat soils, sun to shade, sheltered, intolerant of grazing and burning. Ass: *Dryop dil, Carex ela, Molin cae, Eriop vag, Myric gal.*
Rare and mainly lowland: Clarepool Moss; Wem Moss; Shomere Moss; Ossmere: naturalised in Badger Dingle and Old Rectory Wood. Much reduced by habitat loss and over-enthusiastic gardeners. Decreasing. Endangered.

Ostrich fern
***Matteucia struthiopteris** (L.) Todaro
Naturalised in Badger Dingle and Old Rectory Wood on damp acid soils under the shade of trees.

PARSLEY FERN FAMILY
CRYPTOGRAMMACEAE

Parsley fern
Cryptogramma crispa (L.) R.Br. ex Hooker



Rocky slopes at high altitude, usu among loose boulders or scree with ground-water seepage, on damp soils, PN poor, base poor, acid, stony organic soils, exposed but protected from sun by northerly aspect of slope. Intolerant of summer heat and heavy grazing. Ass: *Festu ovi, Vacci myr, Gymno dry, Dryop aff, Digit pur, Blech spi.*
V. rare: Titterstone Clee (the only Shropshire site); Corndon Hill; Llechrydau (on a stone wall). Parsley fern is at its climatic limit in this region.

BRACKEN FAMILY
HYPOLEPIDACEAE

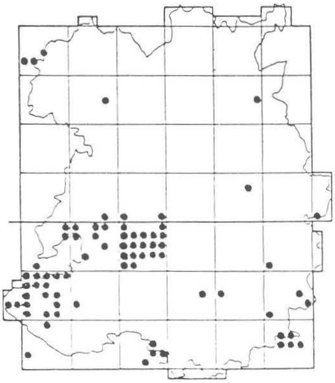
Bracken, 'Fern'
Pteridium aquilinum (L.) Kuhn
Rough grassland, heath, moorland, scrub and open woodland, on dry to damp but well drained soils, PN med, base poor to med, v. acid to neut (rarely calc), sun to ½ shade, often extensively dominant and a v. troublesome weed of grazing land. Ass: *Ulex eur, Cytis sco, Arrhe ela, Agros cap, Digit pur, Holcu mol, Hyaci non, Desch fle, Callu vul.*
Bracken is intolerant of dense shade, late frosts, v. shallow or waterlogged soils, repeated cutting, heavy trampling of young fronds and grazing by cattle. Widepsread and v. common esp in the hill country, but generally decreasing now through selective spraying, ploughing and reseeding of upland pastures. A particularly good example of its method of spreading by rhizomes from an original point of colonisation is seen on the NW slope of the Lawley, where enormous crescent-shaped 'bracken rings' are visible from miles away.

FILMY FERN FAMILY
HYMENOPHYLLACEAE

Wilson's filmy-fern
Hymenophyllum wilsonii Hooker
Damp shady mossy rocks on hillsides on moist organic soils, PN poor, base poor, acid, shaded, sheltered. Intolerant of dry air and competition with taller plants. Ass: *Desch fle, Oxali ace, Vacci myr, Callu vul, Dipl albi, Lepi rept.*
V. rare: recently (1973) refound on the Long Mynd by JRP. An easterly outpost of this oceanic species.

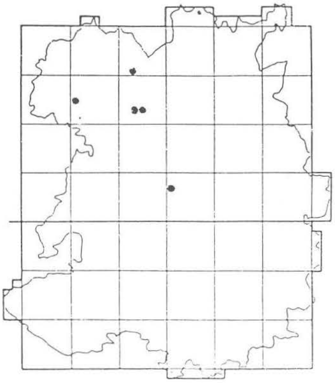
MARSH FERN FAMILY
THELYPTERIDACEAE

Mountain fern, Lemon-scented fern
Oreopteris limbosperma (All.) Holub
(*Dryopteris oreopteris* (Ehrh.) Maxon
Thelypteris limbosperma (All.) H. P. Fuchs
Thelypteris oreopteris (Ehrh.) Slosson)



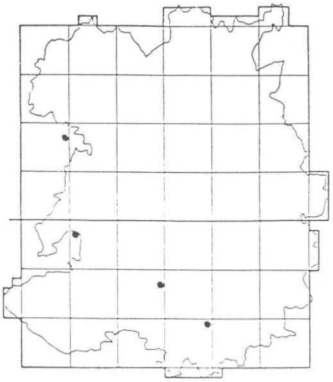
Upland stream banks, dingles, lane sides and woodland margins on damp to moist often stony organic soils, PN poor, base poor to med, acid to mod acid, sun to ½ shade, sheltered and humid. Almost restricted to the hills in this region; probably intolerant of high summer temp and bright sunshine, like parsley fern. Ass: *Athyr fil, Dryop aff, Teucr sco, Luzul syl, Digit pur, Antho odo.*
Locally frequent to abundant in the Church Stretton hills: sparse in Clun Forest; Oswestry uplands; Clee Hills; Wyre Forest.

Marsh fern
Thelypteris thelypteroides Michx.
(*T. palustris* Schott)



Alder woodland or tall sedge fen on deep wet peat, PN med to rich, base rich, neut to calc, sun to shade, sheltered. Intolerant of grazing. Ass: *Carex ela, Carex pata, Calam can, Valer off, Carex ela, Ranun lin.*
Rare: Sweat Mere; Fenemere; Shomere; Yesters. Decreasing through habitat loss.

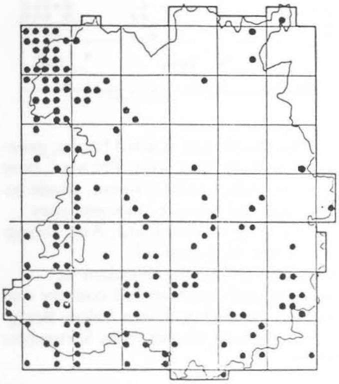
Beech fern
Phegopteris connectilis (Michx) Watt
(*Thelypteris phegopteris* (L.) Slosson)



Stable screes and rocks, woods and stream banks in the hills, on damp to moist stony but humus-rich soils, PN poor, base poor, acid, shade to ½ shade, sheltered. Intolerant of grazing. Ass: *Desch fle, Festu ovi, Galiu sax, Vacci myr, Dryop aff, Teucr sco, Oxali ace.*
Rare: Titterstone Clee; hill near Diddlebury; Corndon Hill.

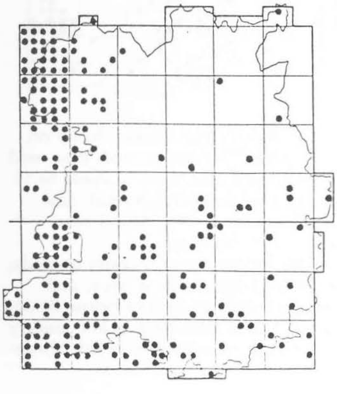
SPLEENWORT FAMILY
ASPLENIACEAE

Black spleenwort
Asplenium adiantum-nigrum L.



In crevices of rocks or cliffs and on stable scree, often in woodland or other shelter, avoiding both limestone and very acidic rocks, generally on dolerite or hard siltstones, rooting in moist organic soils, PN poor, base poor to med, mod acid, ½ shade. Ass: *Umbil rup, Digit pur, Poa nem, Polyp vul, Teucr sco.*
Frequent in Oswestry uplands; locally frequent in Clun Forest; Church Stretton hills; Clee Hills area: sparse in lowlands.

Maidenhair spleenwort
Asplenium trichomanes L.

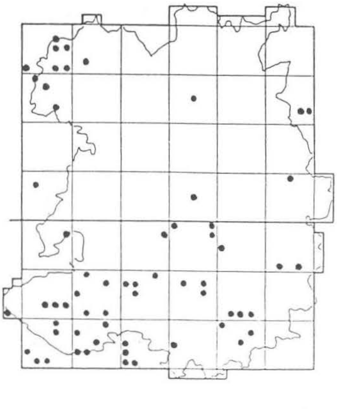


Crevices of old walls, rocks and stable coarse scree, usu on limestone but also found on other basic rocks, PN poor to med, neut to alk, sun to ½ shade, exposed. Ass: *Asple rut, Mycel mur, Teucr sco, Sedum for, Arabi hir, Origa vul, Camp seri, Neck cris.*
Frequent in hill country generally, locally abundant in Oswestry uplands: sparse in lowlands where it is mainly confined to mortared walls. The sspp have not been distinguished in this survey.

Wall-rue
Asplenium ruta-muraria L.

Narrow crevices in rocks and walls, usu confined to limestone or mortar, on dry, PN poor, base rich, calc soils, sun to ½ shade, exposed. Ass: *Asple tri, Teucr sco, Cymba mur, Tort mura, Camp seri.*
Widespread and locally abundant in upland, sparse and mainly on old walls in the lowland.

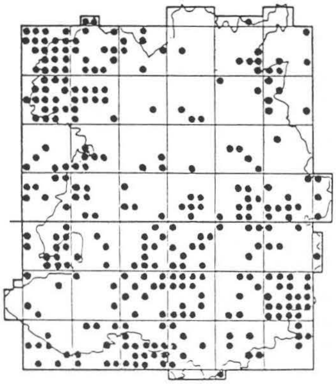
Rustyback
Ceterach officinarum DC.



Mainly a plant of old walls and bridge-parapets, but also found on limestone block-scree, soil dry, but usu rooted in damp mortar, humus or moss-cushions, PN poor, base rich, calc, sunny, exposed. V. persistent, wilting in dry weather but recovering. Ass: *Asple rut, Asple tri, Teucr sco, Cymba mur, Tort mura, Camp seri.*
Hill country, generally sparse but locally frequent.

Hart's-tongue
Phyllitis scolopendrium (L.) Newman

Rocky woods, hedgebanks, screes, old buildings, walls, often rooted in crevices in damp places on well-drained loamy soils, PN med to poor, base rich, neut to calc, sheltered, shaded, cool sites. More shade tolerant than other crevice-rooted ferns. Almost confined to shade in lowlands but sometimes more exposed in the hills. Ass: *Asple rut, Dryop fil, Mycel mur, Polyp int, Heder hel, Ribes uva.*
Widespread and common in the uplands (abundant in Oswestry uplands and Wenlock Edge area), rather sparse in lowlands.

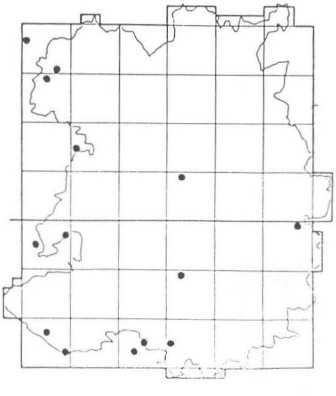


LADY-FERN FAMILY
ATHYRIACEAE

Lady-fern
Athyrium filix-femina (L.) Roth

Shady stream banks, damp woodland and sheltered hollows in hills, on moist to damp soils, PN poor to med, base poor to rich, acid to neut, ½ shade to shade, sheltered and humid, but sometimes exposed in upland sites. Ass: *Dryop aus, Dryop fil, Carex rem, Alliu urs, Ajuga rep.*
Widespread throughout the region in suitable habitats.

Brittle bladder-fern
Cystopteris fragilis (L.) Bernh.



Crevices in walls and rocks. Generally associated with limestone or mortar on damp to moist organic soils. PN poor, base rich, neut to calc, ½ shade to shade, sheltered and humid. Ass: *Asple tri, Phyll sco, Cymba mur*.
Sparse and almost restricted to the western parts of the region.

MALE-FERN FAMILY
ASPIDIACEAE

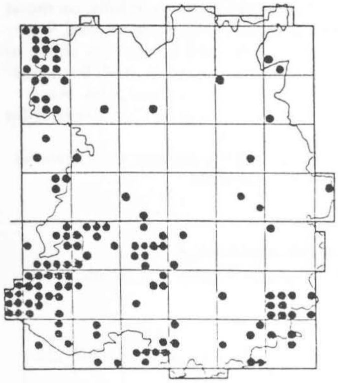
Dryopteris filix-mas agg

Woods, scrub, rocky slopes, river and stream banks and hedgebanks on damp to dry soils, PN poor to rich, base med to rich, mod acid to calc, sun to shade, intolerant of heavy grazing.

Male-fern
Dryopteris filix-mas (L.) Schott

The true male fern is widespread in suitable habitats throughout the region and in such a variety of plant communities that no useful list of associates is possible.

Scaly male-fern
D. affinis (Lowe) Fraser-Jenkins
(*D. pseudomas* (Wollaston) Holub & Pouzar; *D. borreri* Newman)



Woods, open scrub, lane banks, damp ravines and edges of stable screes, on damp soils, PN poor, base poor to med, acid to neut, sun to shade. Ass: *Dryop dil, Teucr sco, Digit pur, Desch fle, Vacci myr*.
Scaly male-fern is widely scattered in the region but sparse in the lowland and commonest in the W esp Oswestry uplands; Clun Forest; Church Stretton hills: also locally frequent in SE. Hybrids with *D. filix-mas* probably occur but have not been recorded.

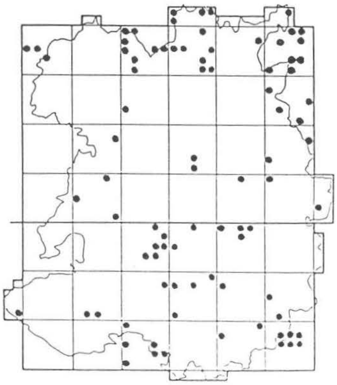
Mountain male-fern
D. oreades Fomin
(*D. abbreviata* (DC.) Newman)

This has been reported (1963 CAS) from the NW ramparts of the hill fort on the summit of Titterstone Clee but not subsequently confirmed: also from Corndon Hill (PMB).

Broad buckler-fern
Dryopteris dilatata (Hoffm.) A. Gray
(*D. austriaca* (Jacq.) Woynar)

Woods, scrub, shady banks, moorland and dry peat mosses on dry to damp soils, PN poor to med, base poor, acid to mod acid, ½ shade to shade, sheltered. Intolerant of grazing. Ass: *Dryop fil, Athyr fil, Vacci myr, Luzul syl, Desch fle, Hyaci non, Holcu mol.*
Widespread throughout the region in suitable habitats.

Narrow buckler-fern
Dryopteris carthusiana (Vill.) H.P. Fuchs (*D. spinulosa* Watt)

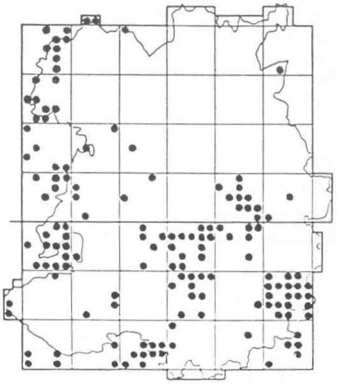


In damp acid woodland, alder carr and lowland moors, often on tree stumps or dead sedge tussocks, on damp to moist peat or rotten wood, PN poor to med, base poor, v. acid to acid, cool and sheltered, ½ shade to shade but also in open. Ungrazed. Ass: *Molin cae, Eriop vag, Oxali ace, Spha fimb, Aula palu.*
Sparse but v. locally frequent on peat mosses in northern lowlands and in Wyre Forest. Decreasing through habitat loss.

Hay-scented buckler-fern
†Dryopteris aemula (Aiton) O. Kuntze

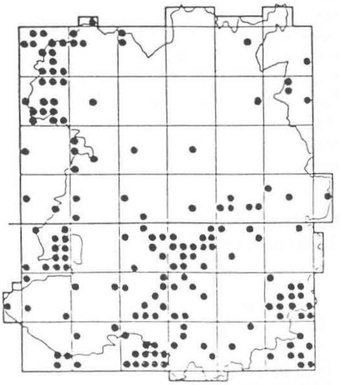
Extinct. Formerly recorded (1858 ?) from Lumhole Pool, Coalbrookdale (Phillips 1877/1878). This site has since been destroyed.

Soft shield-fern
Polystichum setiferum (Forskål) Woynar
(*P. angulare* (Willd.) C Presl)



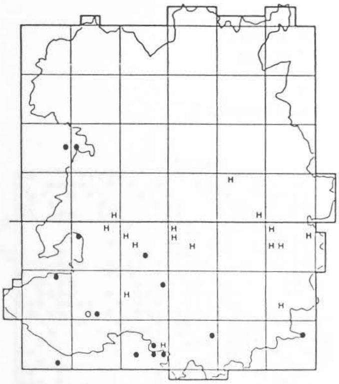
Damp woods and shaded banks, generally on basic clay soils, PN med, base poor to rich, mod acid-neut, shade to ½ shade but survives in some sites after felling of woodland, Ass: *Dryop dil, Athyr fil, Luzul pil.*
Frequent to locally abundant in western and southern hill country and ravines bordering Severn below Bridgnorth. Almost absent from Shropshire plain.

Hard shield-fern
Polystichum aculeatum (L.) Roth
(*P. lobatum* (Hudson) Chevall.)



Rocky woods and banks, chiefly on limestone, PN poor to med, base med to rich, mod acid to calc, shade to ½ shade, cool and often humid. Ass: *Phyll sco, Heder hel, Mycel mur, Mercu per, Melic uni.*
Locally frequent on Oswestry uplands; Wenlock Edge; Ludlow area; and ravines bordering Severn below Bridgnorth: sparse elsewhere in hill country and almost absent from North Shropshire plain.

Oak fern
Gymnocarpium dryopteris (L.) Newman
(*Thelypteris dryopteris* (L.) Slosson)



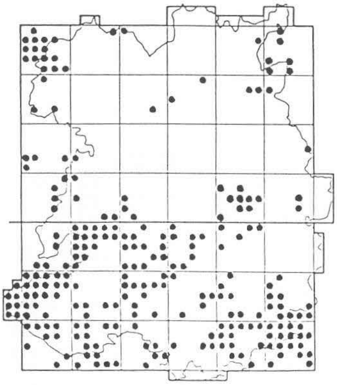
Cool, sheltered places in rocky woods and stable screes, esp on igneous rocks, dolerite etc. Dry to damp, fine humus among stones or boulders, PN poor, base poor, acid to mod acid, shaded and sheltered. Poor competitor with vigorous plants but can form extensive stands esp under heavy shade. Ass: *Dryop aff, Vacci myr, Blech spi, Desch fle, Luzul syl, Phego con.*
V. sparse and now confined to scattered localities in W and S. Formerly more widespread in Central hills and Bridgnorth area. Decreasing.

Limestone fern, Limestone polypody
†Gymnocarpium robertianum (Hoffm.) Newman
(*Thelypteris robertiana* (Hoffm.) Slosson)
Extinct. Recently reported in error from Breidden Hill (1982); formerly recorded from Oswestry (1864) in the mortar of the bridge over the Morda. The note in *HFS* reads "I was informed some years afterwards that this root was taken away by an Oswestry 'florist' and that he also exterminated the species at Llanymynech Hill, after my rediscovery of it there in 1864 as reported in the 'Proceedings of the Oswestry Field Club'. W. Whitwell". Dubious records from Cheney Longville (2.11 Griffiths) and from Stoke Wood (1908 Painter).

HARD FERN FAMILY
BLECHNACEAE

Hard fern
Blechnum spicant (L.) Roth

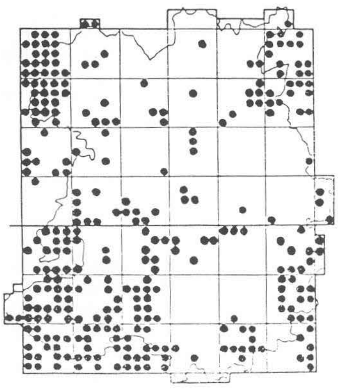
In shady woods and sheltered areas on moorland or heathland, and occasionally in rock crevices on damp to moist sandy or stony soils with thick raw humus, PN poor, base poor, v. acid to acid, shade (lowland) to ½ shade (upland), often on N facing slopes, cool. Tolerant of mod but not heavy grazing. Ass: *Luzul syl, Vacci myr, Callu vul, Desch fle, Melam pra, Dicr maju, Plag undu, Leuc glau.*



Common in the uplands apart from limestone areas: sparse in the lowland where it is confined to heathy woods.

POLYPODY FAMILY
POLYPODIACEAE

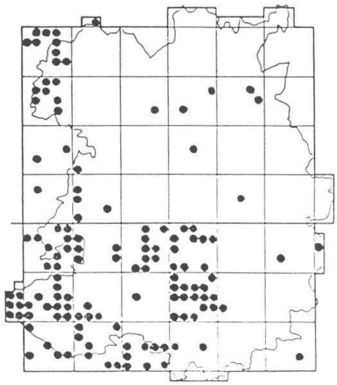
Common polypody
Polypodium vulgare agg



P. vulgare L. ss
Wall tops, rocky banks, screes, the branches of old trees, on damp organic soils, PN poor, base poor, v. acid to acid, shady. Ass: *Umbil rup, Digit pur, Hypn cupr, Dicr scop, Dicr cirr.*
Widespread and common in western uplands: frequent in suitable habitats in lowland and south-eastern uplands.

P. interjectum Shivas

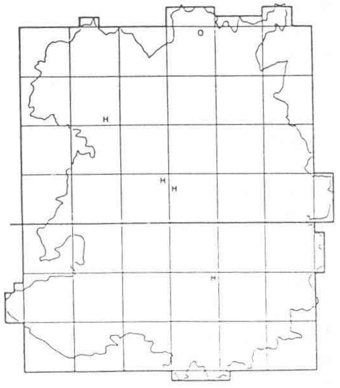
In crevices in outcrops of limestone and other basic rocks, on screes, walls and occas on trees, PN poor, base med to rich, mod acid to calc, ½ shade. Ass: *Mycel mur, Asple tri, Cysto fra, Ceter off, Phyll sco.*
Locally frequent in Oswestry uplands; Clun Forest; Central hills and Wenlock Edge area: v. sparse elsewhere. The hyrid *P. interjectum* × *vulgare* is probably frequent but overlooked.



P. cambricum L.
(*P. australe* Fée)
V. rare but probably overlooked. On limestone and other basic rocks, Llynclys Hill and Ludlow.

PILLWORT FAMILY
MARSILIACEAE

Pillwort
†Pilularia globulifera L.



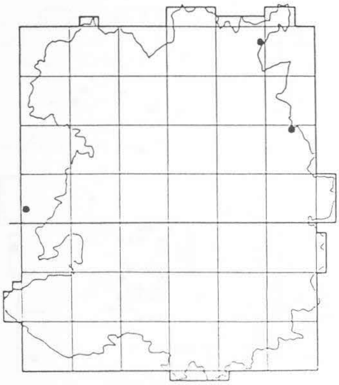
Extinct?
Formerly recorded from a pool between Knockin and Nesscliff; Bomere Pool (1874); Betton Pool; bog at Ashfield (1904); and, most recently, from the shore of a shallow, acid, PN poor pool at Brown Moss (1963 EMR and CAS).

WATER FERN FAMILY
AZOLLACEAE

Water fern
***Azolla filiculoides** Lam.

Introduced and established for short periods in eastern lowland ponds and canals, sometimes becoming dominant but seldom surviving hard winters. Ass: *Lemna min, Lemna pol, Hydro mor.*

(Map: overleaf)



Rare: pool near Betton Moss; old canal at Newport; New Pool, Coalbrookdale; Berriew. Sporadic.

Gymnospermae
Coniferopsida

PINE FAMILY
PINACEAE

Douglas fir
***Pseudotsuga menziesii** (Mirb.) Franco
Extensively planted and occasionally reproducing successfully by seeding.

Western hemlock
***Tsuga heterophylla** (Rafin.) Sargent
Extensively planted and occasionally reproduces successfully by seeding. On Nesscliff Hill there was until recently an elite parent tree surrounded by two generations of offspring.

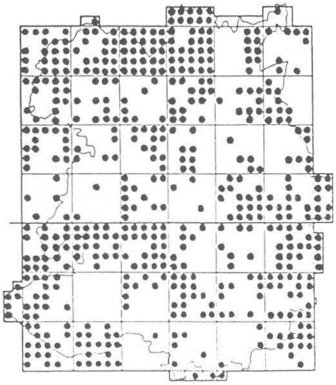
Norway spruce, Christmas tree
***Picea abies** (L.) Karsten
V. widely planted as a cash crop (for Christmas trees), as well as for forestry purposes.

Sitka spruce
***Picea sitchensis** (Bong.) Carrière
Extensively planted on poorly drained soils and difficult sites in the uplands. Too prickly to be popular as a Christmas tree.

European larch
***Larix decidua** Miller
V. widely planted for more than two centuries past, and frequently reproduced by seeding, some becoming established in new habitats eg the limestone cliffs of Blodwel Rock. A group of ancient larches still survives at Linley Hall, where they were introduced by Robert More who was a friend of Linnaeus. A v. interesting 'provenance' trial of larch seed from different parts of central and northern Europe was carried out by the Forestry Commission in Blakeridge Wood near Bishops Castle in the 1950s – the differences in performance were remarkable.

Japanese larch
***Larix kaempferi** (Lamb.) Carrière
(*L. leptolepis* (Siebold & Zucc.) Endl.)
Extensively planted and generally preferred by foresters to European larch; the hybrid L. *decidua* × *kaempferi* is also popular.

Scots pine
***Pinus sylvestris** L.



Woods on acid soils ranging from New Red Sandstone to peat, but not completely avoiding limestone (e.g. self-sown on Blodwel Rock), on damp to dry, PN med to poor, base poor (to rich), v. acid (to calc), sunny to shady, often exposed sites. Ass: *Querc pet, Betul pen, Betul pub, Sorbu auc, Taxus bac.*
Scots pine reproduces freely by seed in this region and behaves like a native tree on the sandstone hills and some of the peat mosses of the N Shropshire plain. Sub-fossil pine stumps are often found in peat cuttings and ditches on Whixall Moss and elsewhere. The pollen record, however, suggests that it became extinct for thousands of years and was reintroduced perhaps as late as the 17th century (see also 2.1).
Widespread throughout region: well naturalised on World's End Moss; Nesscliff Hill; Myddle Hill; Hawkstone Park, etc.

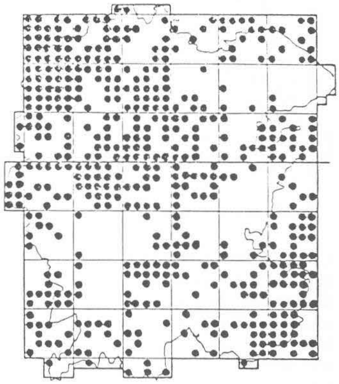
Corsican pine
***Pinus nigra** Arnold
Fairly extensively planted for ornament as well as forestry purposes; grows better than Scots pine on heavy lowland soils.

CYPRESS FAMILY
CUPRESSACEAE

Juniper
$ Juniperus communis L.
Extinct in v c 40.
Recently rediscovered just outside Shropshire, in part of Bringewood Chase (v c 36) by Martin Noble of the Forestry Commission.
Formerly recorded in Wyre Forest; woods at Burford and Ashford Carbonel; Carregybig and Craignant near Selattyn.

YEW FAMILY
TAXACEAE

Yew
Taxus baccata L.



Old mixed woodlands, rocky hillsides and cliffs (esp limestone), on well drained stony or loamy soils, damp to dry, PN med, base med to rich, acid to calc, sun to shade. A characteristic member of the ancient woodland community esp, but not exclusively, on calc soils. Ass: *Fraxi exc, Ulmus gla, Coryl ave, Sorbu ang, Querc rob, Querc pet.*
Scattered but locally frequent as a native tree e.g. in Blodwel Wood and Jones's Rough on limestone, and Wyre Forest on acid rocks. Formerly planted and well established in churchyards, gardens, amenity woods, parks and as ornamental hedge plants. In Wyre Forest and certain other woods many of the old and large yews survive because the woodmen avoided felling them through superstition or for more practical reasons (as yew wood is extremely hard).
Yews were badly damaged by frosts during the hard winter of 1981–2 in parts of the North Shropshire plain.
'Fastigiata'
The Irish yew is commonly planted in parks and gardens. 'Dovastoniana', the West Felton yew, still survives where John Dovaston planted it at The Nursery at West Felton in 1777 (see 2.7).

Angiospermae
Dicotyledones

BUTTERCUP FAMILY
RANUNCULACEAE

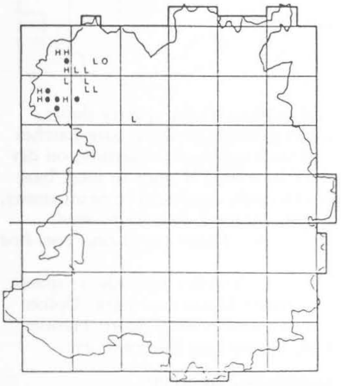
Marsh-marigold, Kingcup, 'Mayblobs', 'Mayflowers', 'Boots', 'Meadow bout'

Caltha palustris L.

Fens, alder woods, swamps, ditches, springs and flushes in pasture on wet to moist, muddy or peaty soils, often where water stands in winter, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sometimes forming pure patches in the wettest part of the field. Ass: *Carex rem, Carex ela, Carex amis, Juncu art, Glyce flu, Carda pra, Lychn flo, Apium nod, Veron bec, Ranun fla.*

Widespread and common in suitable habitats throughout region except at highest altitudes. Decreasing in grassland sites as a result of improved land drainage.

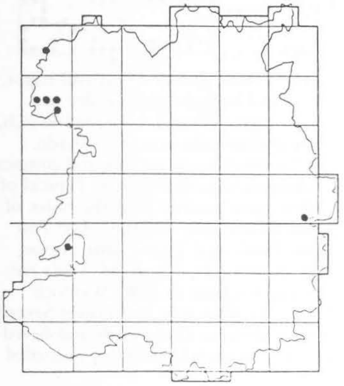
Globeflower
Trollius europaeus L.



Woodland glades, damp meadows, fens and stream banks on damp to wet clay or peaty soils, PN poor to med, base rich, calc, sun to ½ shade, cool and sheltered. Tolerant of mod grazing and generally avoided by livestock. Ass: *Filip ulm, Geum riv, Juncu sub, Alche* spp, *Aquil vul, Gymna con.*

V. local: frequent on limestone in Oswestry uplands; formerly extending into nearby plain as far as Baschurch. Decreasing.

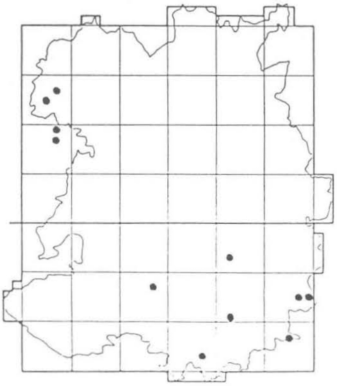
Stinking hellebore
Helleborus foetidus L.



Hedgebanks, edges of pastures, scrub and open woodland and quarry floors, on limestone or dry shallow soils, PN med to poor, base rich, calc, sun to ½ shade, sheltered. Ass: *Daphn lau, Epipa hel, Orchi mas, Primu ver, Primu vul, Clino vul, Brach syl.*

Possibly originating as a garden escape but so well established far from all dwellings as to seem native. V. local: frequent in limestone hills near Oswestry; planted elsewhere.

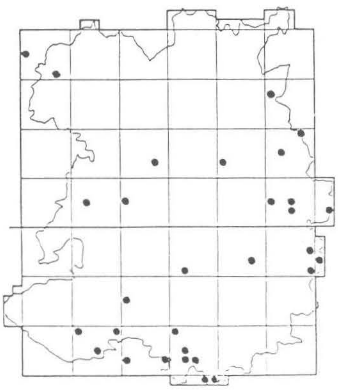
Green hellebore
Helleborus viridis L. ssp **occidentalis** (Reuter) Schiffner



Open woods, dingles, hedgebanks and edges of fields on limestone or other basic rocks on dry to damp soils, PN med, base med to rich, neut to calc, sun to ½ shade, sheltered. Ass: *Brach syl, Circa lut, Mercu per, Sanic eur.*

Probably native, at least in some woodland sites. V. sparse in NW upland and SE of region; absent elsewhere.

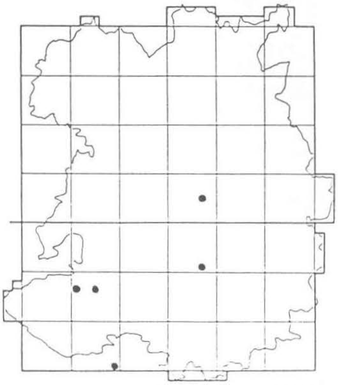
Monk's-hood
'Cats tail', 'Monk's coule'
Aconitum napellus L.
(Incl. **A. anglicum** Stapf)



Stream and river banks, scrub, open woodland, meadows and roadsides on moist to damp soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered. Generally among tall luxuriant grassy vegetation. Ass: *Carex rem, Chrys opp, Chrys alt.*

Widespread but v. sparse throughout most of region: locally frequent in Lower Severn Valley and near Ludlow where it is probably native.

Winter aconite
***Eranthis hyemalis** (L.) Salisb.



Long established and well naturalised in Shipton churchyard; Cound Hall; and at Adforton (v c 36).

Wood anemone, Windflower
Anemone nemorosa L.

Open woodland and scrub, hedgebanks, old pastures and meadows on dry to damp usu well drained soils, PN poor to med, base med to rich, mod acid to calc, sun to ½ shade, typical member of the herb-rich community of woodland edges or managed coppice esp under hazel. Ass: *Primu vul, Primu ver, Hyaci non, Stell hol, Silen dio, Viola rei, Adoxa mos.*

The form with deep rose-coloured backs to the sepals is common in some populations. Widespread throughout the more wooded parts of the region but sparse in the NE lowland and at high altitudes.

Yellow anemone
***Anemone ranunculoides** L.

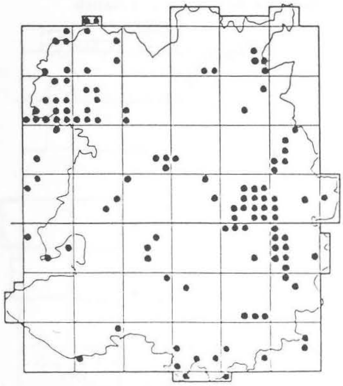
Long naturalised at the edge of a field in Great Ness.

Blue anemone
***Anemone apennina** L.

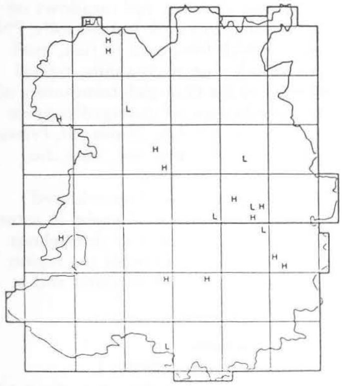
Well established in a long-neglected garden (now rough open ground) at Bishops Castle (1981 SMN). Reported in *RBF* 1939 from Pitchford Churchyard: Pant (1964 *TCSVFC*).

Traveller's-joy
'Old-man's-beard'
Clematis vitalba L.

Scrub, woods, hedges, banks, waste ground, quarries, spoil heaps and old buildings, often associated with limestone but by no means confined to it, on dry often stony soils, PN med to rich, base rich, neut to calc, sun to ½ shade, scrambling over bushes and small trees, cliffs, walls and banks, sometimes marking the sites of former lime kilns or disturbed and enriched soils in otherwise non-calc districts. Ass: *Taxus bac, Euony eur, Cornu san, Coryl ave, Daphn lau, Ribes uva, Sambu nig.*



Traveller's-joy can become a troublesome weed when it invades short vegetation such as limestone grassland. Locally frequent to abundant in Oswestry uplands and Ironbridge-Bridgnorth area; sparse but perhaps still increasing elsewhere.



This species was rare in Leighton's time, when it was only recorded from Whitcliff; Ludlow; Harley churchyard; Lincoln Hill, Ironbridge; Brown Hill, Ruyton; near Wellington; and Willey. Its absence at that time from the limestone outcrops, and its subsequent spread, suggest that it may not be native to this region.

Meadow buttercup
Ranunculus acris L.

Meadows, verges, fens and marshy ground on moist to dry clay or loam soils, PN med to rich, base med to rich, mod acid to calc, sunny. A typical member of the herb-rich lowland meadow community. Ass: *Leuca vul, Centa nig, Succi pra, Rumex aosa, Lathy pra.*
Tends to be replaced by the bulbous buttercup on drier calc soils and by creeping buttercup on damp fertile soils. Widespread and common throughout region except in NE plain and at higher altitudes.

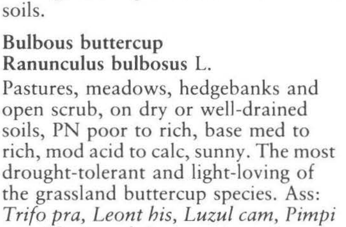
Creeping buttercup
Ranunculus repens L.

Damp grassland and open woodland, ditches, pond margins, fens, rubbish tips, arable fields and gardens, on wet to damp soils, PN rich, base med to rich, mod acid to calc, sun to shade. An indicator of fertile soils much enriched in phosphate and nitrogen. Ass: *Urtic dio, Glech hed, Poa tri, Galiu apa, Elymu rep, Lamiu pur, Tarax off.*
Widespread and abundant throughout the region except on the most infertile soils.

Bulbous buttercup
Ranunculus bulbosus L.

Pastures, meadows, hedgebanks and open scrub, on dry or well-drained soils, PN poor to rich, base med to rich, mod acid to calc, sunny. The most drought-tolerant and light-loving of the grassland buttercup species. Ass: *Trifo pra, Leont his, Luzul cam, Pimpi sax, Plant med, Sangu min.*
Widespread and locally common on suitable soils esp at middle altitudes.

Corn buttercup, Corn crowfoot
'Devil currycomb', 'Jack-o'-two-sides'
'Worry wheat'
$ **Ranunculus arvensis** L.

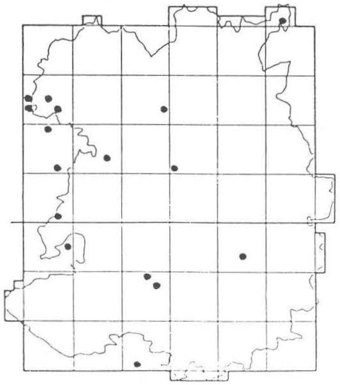


Formerly a common troublesome cornfield weed, now apparently extinct in v c 40, though recorded among wheat and grass in a field near Clows Top (v c 37); and from Monksfields on the Long Mountain (v c 47).

Hairy buttercup
Ranunculus sardous Crantz

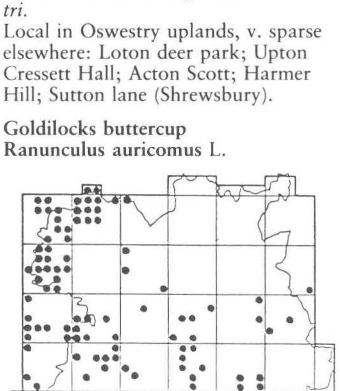
Found in 1971 in a garden at Alcaston. "Since then found in surrounding arable fields, sometimes in great numbers up to 0.5km from garden. Frequently grows as an over-wintering annual preferring wet ground. One over-wintering plant produced 2,000 flowers during the next year" (HH). Recorded rarely from cornfields in the 19th century.

Small-flowered buttercup
Ranunculus parviflorus L.



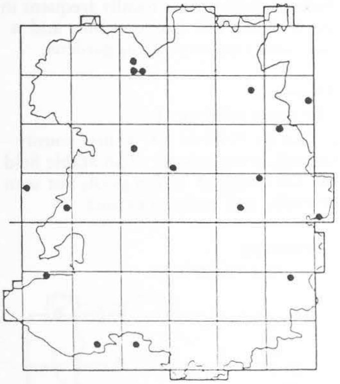
Old railway tracks, quarry floors, waste ground, gardens, bare patches and rock outcrops in pasture, on dry shallow soils, PN poor to med, base med to rich, mod acid to neut, sunny, warm, exposed. Ass: *Trifo med, Aphan arv, Poten ang, Lotus cor, Poa tri.*
Local in Oswestry uplands, v. sparse elsewhere: Loton deer park; Upton Cressett Hall; Acton Scott; Harmer Hill; Sutton lane (Shrewsbury).

Goldilocks buttercup
Ranunculus auricomus L.



Open woods, grassy woodland edges, scrub and hedgebanks, on dry usu loamy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, intolerant of heavy grazing and compet with more vigorous plants. Typical of rather open patches near the boles of trees. Genetically variable. Ass: *Poa nem, Prune vul, Lysim nem, Agros cap, Antho odo, Luzul pil, Viola riv.*
Locally frequent in NW, Wenlock Edge – Ludlow area and Lower Severn Valley between Bridgnorth and Bewdley; sparse elsewhere and unrecorded in NE.

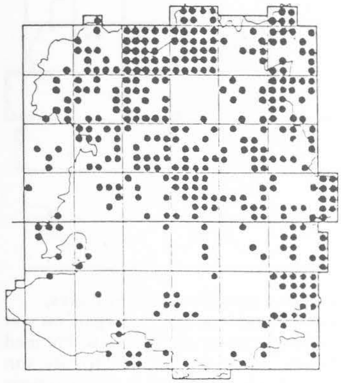
Greater spearwort
Ranunculus lingua L.



Edges of pools and meres, in reedswamp, between sedge tussocks or in alder woodland on waterlogged and winter-flooded peat, mud or silt, PN med to rich, base rich, neut to calc, sun to shade, warm and sheltered. Intolerant of grazing or trampling. Ass: *Carex ela, Carex pata, Cicut vir, Solan dul, Myoso sco, Iris pse, Phrag aus, Typha ang.*
Sparse and confined to lowlands: particularly associated with meres.

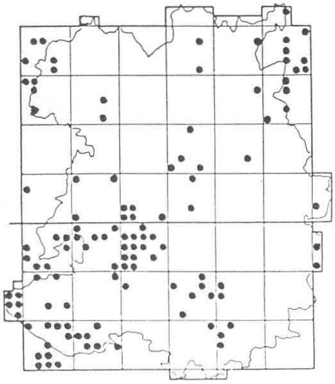
Lesser spearwort
Ranunculus flammula L.
Stream sides, ditches, flushes, springs, wet hollows in pasture, on winter-wet mud, clay or peaty soils, PN poor to med, base med to rich, acid to calc, sunny, tolerant of grazing and trampling but a rather weak competitor with taller plants. Ass: *Veron bec, Juncu art, Myoso lax, Galiu pal, Menth arv, Carex ova, Carex ech, Carex pcea.*
V. variable in form and size, probably of great genetic diversity. Widespread in suitable habitats, much commoner in upland than lowland.

Celery-leaved buttercup, celery-leaved crowfoot
Ranunculus sceleratus L.



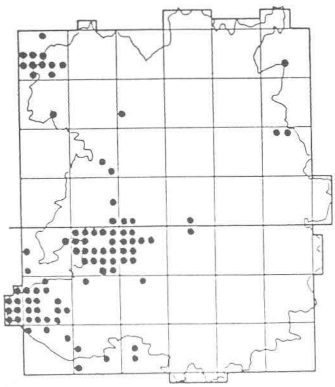
Winter-inundated edges of pools, lakes, canals and in flood zone of rivers and streams on exposed bare mud, PN med to rich, base med to rich, neut to calc, open and sunny, favoured by trampling but a poor competitor. A pioneer species of bare mud. Ass: *Alism pla, Lemna min, Biden cer, Myoso lax, Veron bec, Polyg hyd.*
Widespread and frequent in suitable habitats throughout the lowland area, sparse to rare in the hills.

Ivy-leaved crowfoot
Ranunculus hederaceus L.



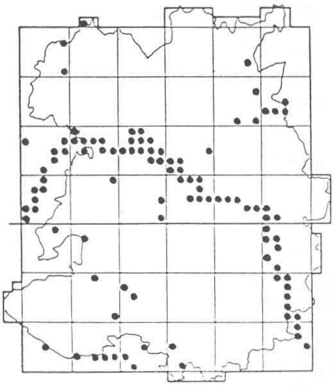
Edges of pools or ephemeral puddles, springs and seepages in shallow water over peat or clay soils, PN poor, base poor to med, acid to neut, sunny, exposed, cool. Ass: *Myoso sec, Monti fon, Calli* spp., *Stell als, Juncu buf.*
Locally frequent in Central hills; Clee hills; Clun Forest: sparse elsewhere, though commoner in upland.

Round-leaved crowfoot
Ranunculus omiophyllus Ten.
(*R. lenormandii* F. W. Schultz)



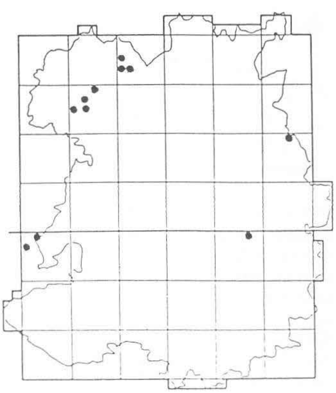
Edges of pools, ditches and other small but fairly permanent water bodies, in shallow standing water on peaty soil or on mud, PN poor, base poor, acid to mod acid, sunny, exposed, cool, sometimes associated with disturbance. Ass: *Calli sta, Glyce dec, Lythr por, Monti fon, Myoso sec, Stell als, Ranun fla, Hydro vul.*
Locally frequent in Central hills and extreme W of region: absent elsewhere.

River water-crowfoot
'Reites'
Ranunculus fluitans Lam.



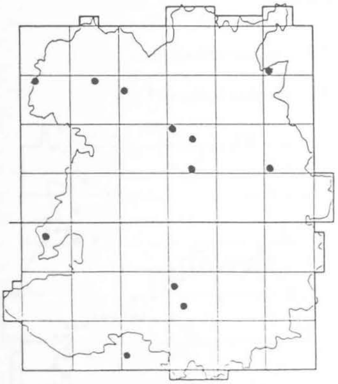
Larger lowland rivers, esp on stony riffles in shallow turbulent water, swift flowing, PN rich, base rich, sunny, often in extensive pure patches. Ass: *Myrio spi, Potam per.*
When this species is flowering in the early summer it can be seen clearly from the air, picking out the stony shallows at regular intervals along the bed of the R Severn and R Teme and tributaries of both.

Fan-leaved water-crowfoot
Ranunculus circinatus Sibth.



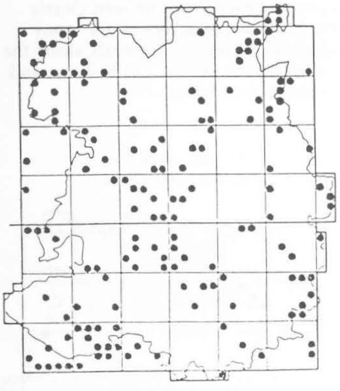
Meres, pools, and disused reaches of canals, in mod deep clear still or slow flowing water, PN rich, base rich, neut to calc, sunny, sheltered. Entirely submerged except flowers and fruit. Ass: *Calli obt, Sparg eme, Nupha lut, Potam cri, Lemna tri.*
Rare except in suitable reaches of Montgomery and Newport Canals: also The Mere; Blake Mere; and Cole Mere; ponds near Chirbury; pool at Willey Park.

Thread-leaved water-crowfoot
Ranunculus trichophyllus Chaix



Pools, ponds, pits and disused reaches of canals, in shallow water (sometimes only seasonally wet), PN med to rich, base med to rich, neut, sunny. Ass: *Glyce max, Potam ber, Alism pla, Calli* spp.
Sparse in lowland, v. rare in hills.

Common water-crowfoot
'White crowfoot'
Ranunculus aquatilis L.

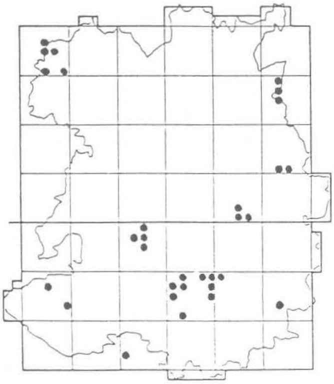


Ponds or shallow pools, ditches, slow streams, disused reaches of canal and winter-wet hollows in fields, PN med to rich, base med to rich, mod acid to calc, sunny, tolerant of strong variations in water level and of slowly flowing water. Often in pure stands. Ass: *Poten pal, Menya tri, Menth aqu, Lemna min, Carex ros, Carex pse.*
Locally frequent throughout region, both lowland and upland.

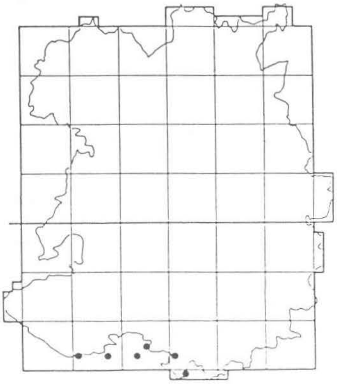
Common water-crowfoot
Ranunculus peltatus Schrank

Ponds and shallow pools in similar conditions to *R. aquatilis*, but less common. Ass: *Calli sta, Glyce dec, Ranun omi, Lemna min, Potam com.*
Mainly in the hills. Oswestry uplands, Central hills, Clee hills area; NE border of Shropshire.

(Map: next column)



Chalk-stream water-crowfoot
Ranunuclus penicillatus (Dumort.) Bab. var. **calcareus** (R. W. Butcher) Cook
(*R. pseudofluitans* (Syme) Baker & Foggitt)



Swift-flowing lowland rivers and streams, esp on coarse stony riffles in shallow turbulent water, PN med to rich, base rich, calc and alk, sunny, often forming extensive patches in smaller base rich waters, but replaced by *R. fluitans* in larger rivers. Ass: *Myrio spi, Potam cri, Ranun flu.*
Local: in the R Teme at 6 sampling stations: near Ashford Carbonel; Dinham Bridge, Ludlow; near Stowe (v c 40 & 43); and in v c 36 at Brampton Bryan; Criftin Ford Bridge; and Bringewood Forge Bridge (1980 N Holmes).

Lesser celandine
Ranunculus ficaria L.

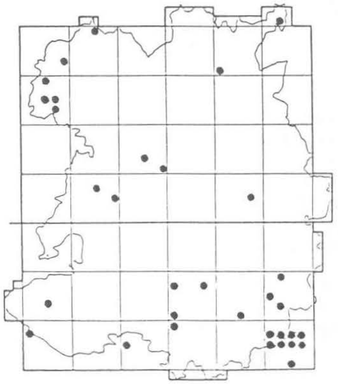
Hedgebanks and verges, woodland margins and clearings, old grassland lawns and flowerbeds on moist to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to shade. A conspicuous flower of the early spring whose leaves die down before the main flush of grassland growth. An attractive but persistent garden weed esp on rich and heavy soils. Ass: *Poa tri, Poa ann, Glech hed, Galiu apa, Belli per, Ranun rep, Allia pet.*

Ssp **ficaria** is abundant throughout the region except at highest altitudes; ssp **bulbifer** Lawalreé is locally frequent in the lowland but sparse in hills and is the more frequent ssp in gardens.

Mousetail
Myosurus minimus L.

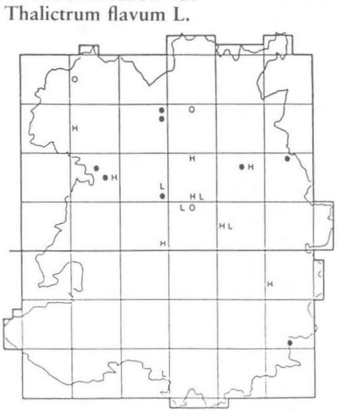
Found by PHO in 1970 (first county record), in wet corner of an arable field by NW shore of Betton pool; not seen recently, and perhaps extinct.

Columbine
Aquilegia vulgaris L.



Open woodland and scrub, stream banks and neglected roadside verges, on damp to dry soils, PN med, base med to rich, mod acid to calc, ½ shade, sheltered. Ass: *Ajuga rep, Dacty fuc, Filip ulm, Liste ova, Primu vul, Fraga ves, Primu ver, Viola rei, Eupho amy.*
Locally frequent and well established as a garden escape in several areas, but probably only native in limestone hills near Oswestry and in Wyre Forest.

Common meadow-rue
Thalictrum flavum L.

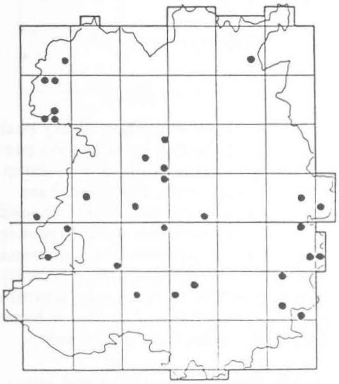


Old hay meadows, stream banks, ditches and woodland margins on wet to damp clay or alluvial soils, PN med to rich, base rich, mod acid to calc, sun to ½ shade, sheltered. A characteristic

member of lowland meadows. Ass: *Filip ulm, Lychn flo, Achil pta, Iris pse, Senec aqu, Myoso sco, Angel syl, Phala aru.*
Confined to lowland and never v. common in region: now restricted to c. 6 sites, one of which (Rue Wood near Wem) is an STNC Reserve.

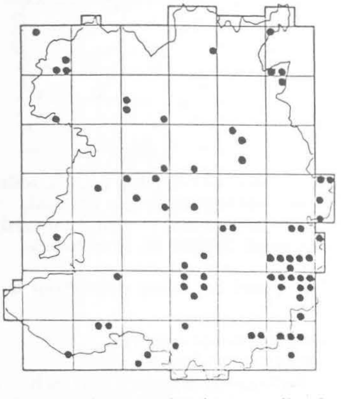
BARBERRY FAMILY
BERBERIDACEAE

Barberry
Berberis vulgaris L.



Old hedges and woodland margins on damp to dry soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade. Ass: *Crata mon, Coryl ave, Cornu san, Acer cam, Ilex aqu, Prunu spi.*
Sometimes a garden escape but also long established in sites distant from habitation, persisting in spite of its bad reputation as the alternative host to wheat rust. Widespread but sparse and mainly lowland.

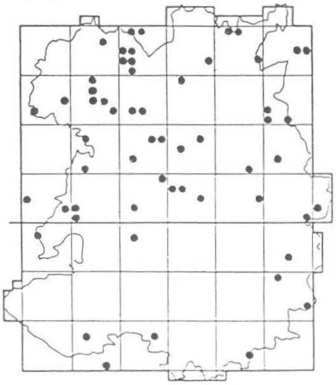
Oregon-grape
***Mahonia aquifolium** (Pursh) Nutt.



Extensively naturalised in woodland and hedges throughout the region, mainly lowland.

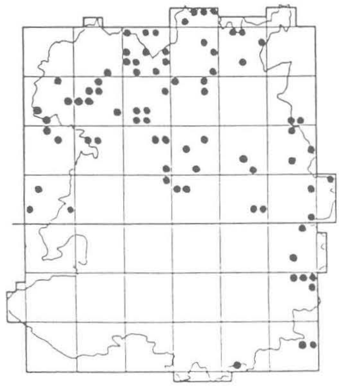
WATER-LILY FAMILY
NYMPHAEACEAE

White water-lily
Nymphaea alba L.



Meres, deep pools, ornamental lakes and ponds, in PN rich, base rich water, bottom-rooted in mud or clay but flowering at surface; sun to ½ shade, sheltered. Intolerant of much water movement. Ass: *Nupha lut, Potam nat, Phrag aus, Lemna min, Lemna tri.*
Mainly lowland, probably introduced in most places but may be native in certain meres.

Yellow water-lily
Nuphar lutea (L.) Sm.

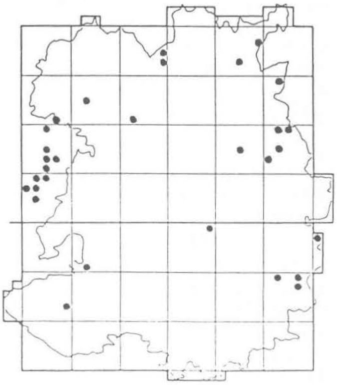


Meres, pools, rivers and canals, in shallow to fairly deep PN rich, base rich water, firmly bottom-rooted usu in mud or clay but flowering at surface, sun to ½ shade, sheltered. More conspicuous in still or slow-flowing waters because of floating leaves, but capable of withstanding strong spate in clay rivers where it only forms submerged 'cabbage' leaves. Ass: *Nymph alb, Potam nat, Phrag aus, Lemna min, Lemna tri, Sagit sag, Sparg ere.*
Locally frequent in N Shropshire plain and Lower Severn Valley: absent from hill country and arable NE.

Least water-lily
Nuphar pumila (Timm)DC.
Meres, in fairly deep PN rich, base rich water, in sheltered bays. Ass: *Nupha lut, Polyg amp.*
V. rare; now only known from one of the N Shropshire meres, though formerly in at least two others. This is its only English locality and it is also rare in Wales, though rather commoner in northern Scotland. Decreasing and endangered. The first emblem of The Shropshire Conservation Trust. First record Kettlemere near Ellesmere (1854 Thomas Cox) (see 2.11).

HORNWORT FAMILY
CERATOPHYLLACEAE

Rigid hornwort
Ceratophyllum demersum L.

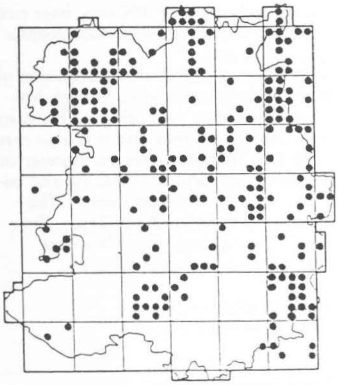


Disused reaches of canal and shallow ponds in PN rich, base rich water, slow flowing to still, sun to ½ shade, sheltered, warm. Spreads vigorously by vegetative growth to form extensive stands, but probably never ripens seed in the region. Ass: *Nupha lut, Elode can, Potam fri, Lemna tri, Hydro mor.*
V. locally abundant in Montgomery Canal: sparse elsewhere in lowlands.

POPPY FAMILY
PAPAVERACEAE

Common poppy, Field poppy
'Thunder-bowt'
Papaver rhoeas L.
Arable fields, sandy roadsides, rubbish tips, waste and disturbed ground on dry freely drained soils, PN rich, base med to rich, mod acid to calc, sunny and warm. Still one of the commonest cornfield weeds in spite of modern farming methods. Ass: *Matri rec, Tripl ino, Sinap arv, Viola arv, Avena fat.*
Widespread and locally frequent esp in lowlands.

Long-headed poppy
Papaver dubium L.

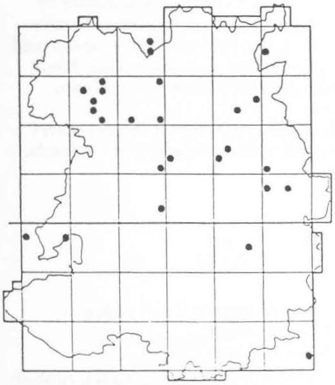


Arable fields and disturbed roadsides on dry sandy or loamy soils, PN med, base med to rich, mod acid to neut, sunny and warm. Ass: *Arabi tha, Rapha rap, Sinap arv, Silen alb, Viola arv.*
Widespread and locally frequent throughout lowland Shropshire and in upland vales (Corve Dale and Ape Dale), less common as a field weed than *P. rhoeas* but commoner than *P. argemone.*
(GPR says "commoner than *P. rhoeas* in Clun Forest").

Rough poppy
Papaver hybridum L.

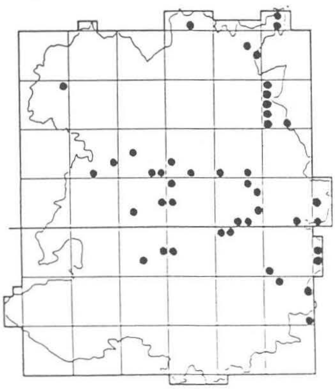
Recorded near Knowbury (1977 CR) (first Shropshire record), and later by JAW at Norbury.
V. rare.

Prickly poppy
Papaver argemone L.



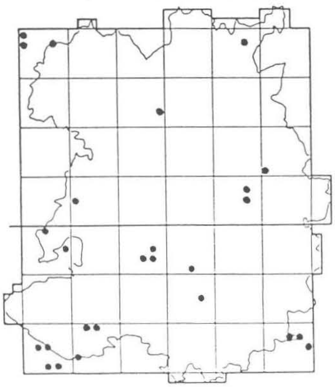
Arable fields and roadsides, on dry sandy soils, PN med, base poor, mod acid, warm and sunny. Ass: *Silen alb, Matri rec, Papav rho, Vicia sat, Polyg avi, Plant maj, Viola arv.*
Much reduced by herbicides but still appears on recently disturbed roadsides and gateways. Sparse on the N Shropshire plain.

Opium poppy
***Papaver somniferum** L.



Widely naturalised and fairly persistent in warmer lowland parts of the region esp on light sandy soils. Locally frequent.

Welsh poppy
***Meconopsis cambrica** (L.) Vig.



A garden escape, long established in cool shady places, v. locally frequent in hill country in S and W of region, rare elsewhere.

Greater celandine
Chelidonium majus L.

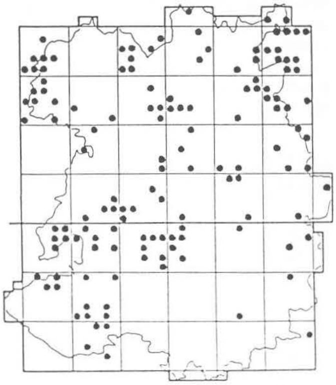
Roadsides, field edges, disturbed ground, rubbish tips and old gardens on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered, warm. Seldom found far from buildings, and often at base of wall. Ass: *Lamiu alb, Allia pet, Ballo nig, Geran mol, Sisym off, Bromu ste.*
Widespread and locally frequent throughout region except at highest altitudes.

FUMITORY FAMILY
FUMARIACEAE

Bleeding-heart
***Dicentra formosa** Walpers

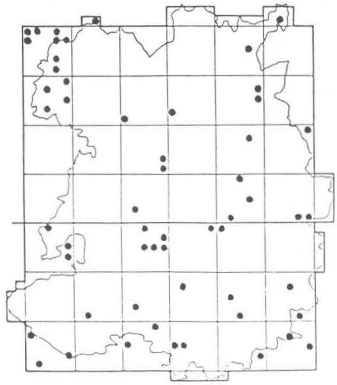
Extensively naturalised in plantation near Brogyntyn estate (1979 MER).

Climbing corydalis
Corydalis claviculata (L.) DC.



Open woodland and edges of dry peat mosses, persisting in grassland on previously wooded sites, on dry to damp sandy or peaty soils, PN poor, base poor, acid, usu sheltered and ½ shaded to shaded but tolerates some exposure to sun. Poor competitor but sometimes abundant in disturbed parts of recently cleared plantations or woods, scrambling over tree stumps. Ass: *Hyper hum, Digit pur, Hyaci non, Lysim nem, Moehr tri.*
Locally frequent in upland and lowland esp associated with sandstone hills and other afforested places: rare in Ludlow and Clee hills area.

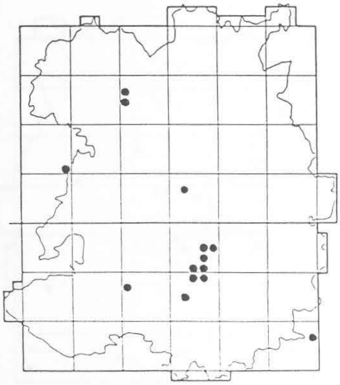
Yellow corydalis
***Corydalis lutea** (L.) DC.



Stony banks or rooted in organic soils in joints of old walls, dry, PN med, base med, mod acid to neut, ½ shaded and warm. Seldom far from habitation.
Widespread but sparse throughout region.

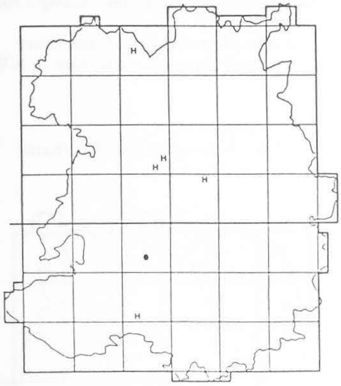
White ramping-fumitory
Fumaria capreolata L.
ssp **babingtonii** (Pugsley) P. D. Sell

Edges of fields, disturbed ground, hedge banks, old walls and buldings on dry well drained soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Ass: *Allia pet, Bromu ste, Galiu apa, Lamiu pur, Veron hed.*



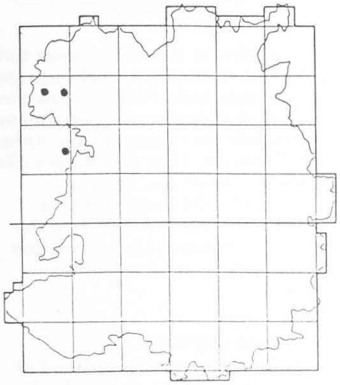
Locally frequent in mid section of Wenlock Edge and Corve Dale: v. sparse elsewhere.

Purple ramping-fumitory
Fumaria purpurea Pugsley



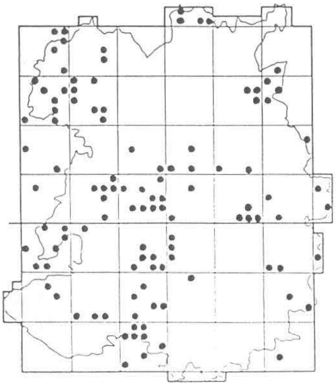
Only one recent record, in a garden near Church Stretton (1978 HMD). Formerly recorded from a few places in the Shrewsury, Ellesmere and Ludlow areas.

Tall ramping-fumitory
Fumaria bastardii Boreau



Roadsides in NW of region.
Rare: Ty Sanley, Sweeney; Tanypistyll, Trefonen. Also in v c 47 at Criggion; near Foel Coppice, Trewern; Montgomery.

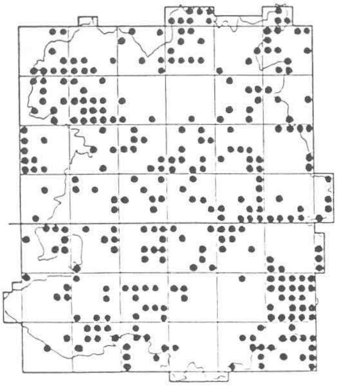
Common ramping-fumitory
Fumaria muralis Sonder ex Koch
ssp **boraei** (Jord.) Pugsley



Banks, cultivated or disturbed ground on dry loamy soils, PN med to rich, base med, mod acid to neut, open sunny and warm. Ass: *Cheno alb, Polyg per, Urtic ure, Veron per, Viola arv.*
Locally frequent to common in both upland and lowland areas: apparently more abundant in western half of region.

Dense-flowered fumitory
†Fumaria densiflora DC.
(*Fumaria micrantha* Lag.)
Extinct? Old records from the cemetary, Shrewsbury; Meole Brace; and Steventon near Ludlow.

Common fumitory
Fumaria officinalis L.



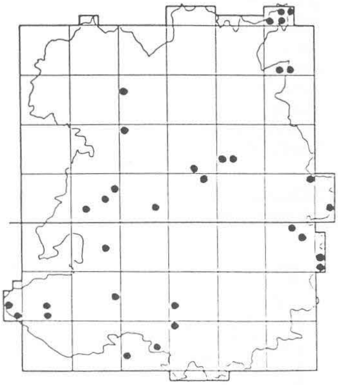
Cultivated ground on damp to dry loamy or sandy soils, PN med to rich, base med, mod acid to neut, open sunny and warm. Ass: *Anaga arv, Cheno alb, Eupho hel, Papav rho, Rapha rap, Sinap arv, Thlas arv.*
Widespread and frequent to locally abundant esp in NW and SE.

The supposed hybrid with *F. muralis,* **Fumaria × painteri,** was first found in Shropshire but has not been recorded for many years (see 2.12).

CABBAGE FAMILY
CRUCIFERAE

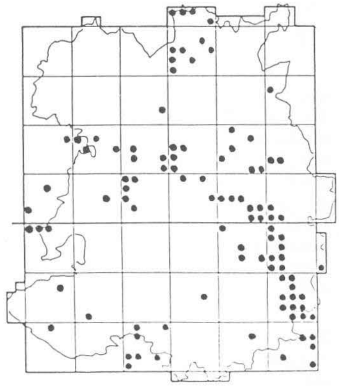
Rape, Swede
***Brassica napus** L.
Frequently naturalised, but seldom persistent, on roadsides. Ssp **oleifera,** oil-seed rape, is increasingly grown as a crop.

Turnip
***Brassica rapa** L.



The cultivated turnip is a common casual species on field edges, roadsides, tips and disturbed ground throughout the region.

Black mustard
Brassica nigra (L.) Koch



River banks and disturbed ground on damp to moist seasonally flooded, often alluvial soils, PN rich, neut to calc, sunny, warm, sheltered. A typical member of the tall-herb community in the flood zone along larger rivers. Ass: *Artem vul, Impat gla, Tanac vul, Salix vim, Phala aru, Urtic dio.*
Frequent to abundant on banks of R Severn and tributaries: sparse to rare elsewhere.

Tall wallflower cabbage
***Rhynchosinapis cheiranthos** (Vill.) Dandy

Casual; railway sidings at Llanymynech station (1964 *TCSVFC*).

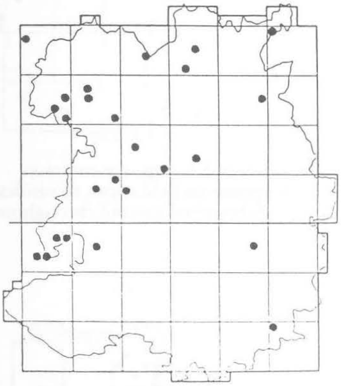
Hairy rocket
***Erucastrum gallicum** (Willd.) O. E. Schulz

One plant growing on the inside edge of pavement in Oswald Rd, Oswestry (1982 BD).

Charlock
'Kedlock'
Sinapis arvensis L.

Arable fields, disturbed ground and rubbish tips on dry soils, PN rich, base med to rich, mod acid to calc, sunny and warm. Still a common field weed. Ass: *Papav rho, Avena fat, Matri rec, Polyg avi, Sonch ole.*
Widespread throughout region esp in lowlands.

White mustard
***Sinapis alba** L.



Sporadic on earthy rubbish tips, old derelict gardens, edges of arable fields, on damp to dry deep loamy soil, PN rich, base rich, neut to calc, sunny, warm, ungrazed, ruderal. Ass: *Sinap arv, Stell med, Senec vul, Lamiu pur, Lamiu alb.*
Locally frequent near Oswestry and Chirbury: sparse elsewhere in N plain and absent from uplands.

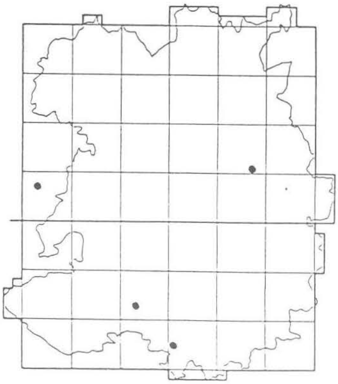
Hoary mustard
***Hirschfeldia incana** (L.) Lagrèze-Fossat

Several plants on bare disturbed ground by a new footpath on the west side of the small woodland on the east edge of Wombridge (1982 WAT).

Annual wall-rocket
***Diplotaxis muralis** (L.) DC.

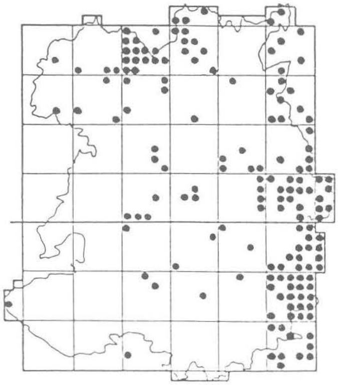
Recorded as a garden weed: Shrewsbury; Pontesbury; Hampton Loade station. Ass: *Arabi tha, Eupho pep, Medic lup, Poa ann, Veron per.*

Perennial wall-rocket
***Diplotaxis tenuifolia** (L.) DC.



Well established and v. locally abundant on bare ground, old buildings and walls: Ludlow; Telford; Welshpool.

Wild radish
Raphanus raphanistrum L.



Disturbed roadsides, edges of arable fields, rubbish tips and waste ground, on dry sandy or loamy soils, PN med to rich, base med to rich, mod acid to neut, sunny. Ass: *Thlas arv, Fumar off, Matri rec, Papav rho, Sinap arv, Viola arv.*
Throughout lowland parts of region, sporadic but locally abundant in Ellesmere area and Lower Severn Valley: sparse elsewhere and rare in SW.

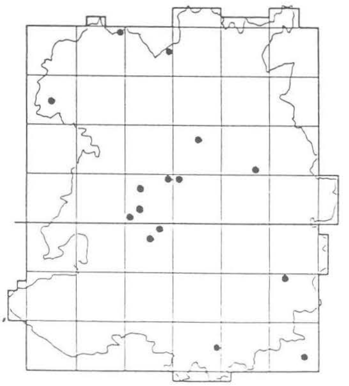
Bastard cabbage
***Rapistrum rugosum** (L.) All.

About 20 plants on dumped loam at south end of a tip on south side of M54 at Ketley (1982 WAT).

Hare's-ear mustard
***Conringia orientalis** (L.) Dumort.

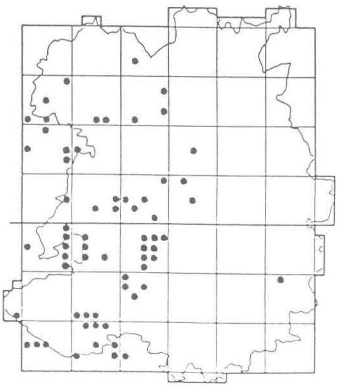
Sides of roads and tracks: near Boningale; between Albrighton and Codsall (1976 BRF).

Field pepperwort
Lepidium campestre (L.) R.Br.



Waste ground, track sides, tips, old railway tracks and field edges on dry sandy or stony soils, PN poor to med, base med to rich, mod acid to neut, sunny, warm. Ass: *Polyg vul, Myoso dis, Aphan arv, Tarax lae , Campa rot, Thymu pra.*
Sparse in Shrewsbury – Pontesbury and Church Stretton areas, rare in NW and SE.

Smith's pepperwort
Lepidium heterophyllum Bentham
(*L. smithii* Hooker)

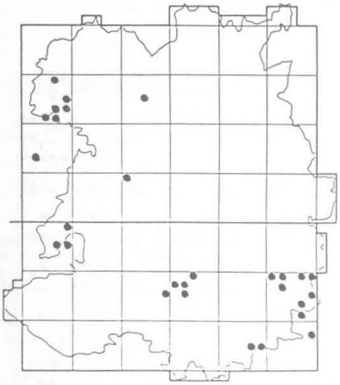


Bare patches in unstable or short-turf grassland, often close to rock outcrops, on dry stony soils, PN poor, base med to poor, mod acid to acid, open, sunny, warm. Tolerant of grazing. Ass: *Aphan arv, Tarax lae, Digit pur, Rumex alla, Festu ovi, Teucr sco, Trifo str.*
Sparse to locally frequent with a marked westerly distribution in this region: common in Church Stretton area and parts of Clun Forest.

Garden cress
***Lepidium sativum** L.

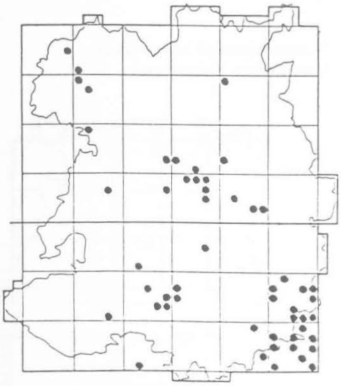
Some 20 plants on a low mound of clay waste by a lane on W side of Jackfield (1982 WAT).

Swine-cress, wart-cress
Coronopus squamatus (Forskål) Ascherson



Waste ground, footpaths, gardens, farmyards and gateways and other trampled sites on dry to damp, often winter-wet soils, PN med to rich, base med, mod acid to neut, sunny. Ass: *Capse bur, Poa ann, Plant maj, Matri mat, Ceras glo, Polyg avi, Gnaph uli.* Locally frequent esp in NW and SE of region.

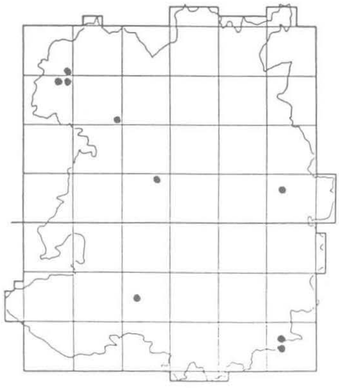
Lesser swine-cress, lesser wart-cress
***Coronopus didymus** (L.) Sm.



Waste ground, fields, gardens, track sides, gateways and farmyards on damp often winter-wet soils, PN rich, base med to rich, mod acid to calc, sunny. Ass: *Capse bur, Poa ann, Senec vul, Tripl mar, Eupho pep, Polyg avi.* Widespread and locally frequent esp in lowlands. First record Shrewsbury 1880 (Beacall).

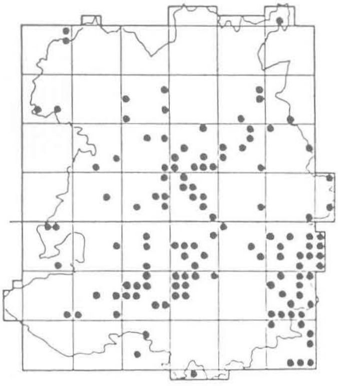
Hoary cress
***Cardaria draba** (L.) Desv.
(*Lepidium draba* L.)

Railway embankments and other built-up disused ground, typically on limestone or clinker ballast on dry stony soils, base rich, sunny, warm. Sporadic and sparse: mainly in Oswestry area but scattered records elsewhere. First record St Georges 1899 (Painter).



Woad
***Isatis tinctoria** L.
One plant on roadside verge near Hinstock, possible escape from nearby herb nursery (1977 BRF).

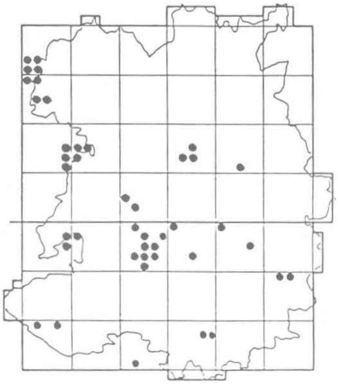
Field penny-cress
Thlaspi arvense L.



Arable fields or open disturbed ground, often associated with quarry spoil tips etc, on dry sandy to stony soils, PN med to rich, base med to rich, mod acid to calc, open sunny and warm. Ass: *Matri rec, Polyg avi, Fumar off, Anaga arv, Aphan arv, Viola arv.*
Frequent to locally abundant in suitable habitats in central Shropshire and SE of region; rare in W and N and in Clee hills area.

***Pachyphragma macrophyllum (Hoffm.) Busch.**
(Thlaspi macrophyllum Hoffm.)
Naturalised in rough grassland in Broncroft Castle grounds (1979 MSF).

Shepherd's cress
Teesdalia nudicaulis (L.) R.Br.



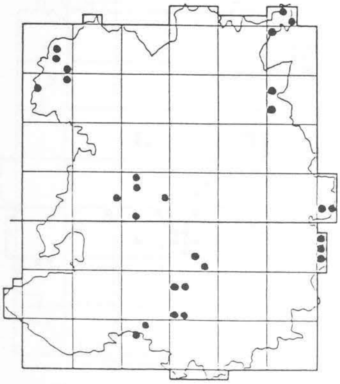
Bare ground in short grassland, esp where disturbed by rabbits or ants, and on fine scree, often on basic igneous or hard sedimentary rocks but not limestone. On dry sandy or stony soils, PN poor, base med, mod acid to neut, open, sunny and warm. A winter annual and a characteristic member of pioneer communities on ant hills and on intermittently parched S facing slopes. Ass: *Ornit per, Eroph ver, Ceras sem, Hiera pil, Aira pra, Myoso dis.*
Locally frequent to abundant in Oswestry uplands (except limestone): Breidden hills; Long Mynd and neighbouring hills; Haughmond Hill: sparse elsewhere in hill country and absent from northern plain.

Shepherd's-purse
Capsella bursa-pastoris (L.) Medicus
Farmyards, gardens, arable fields, gateways, waste ground and other trampled places on damp to dry but winter-wet soils, PN rich, base med to rich, mod acid to calc, sunny and warm. Ass: *Poa ann, Plant maj, Matri mat, Polyg avi, Cheno alb.*
Throughout region, abundant in suitable places.

Hutchinsia
†Hornungia petraea (L.) Reichenb.
Extinct. Formerly recorded on 'hills behind Oswestry' where it probably grew on bare patches of shallow calc humus on limestone cliff-ledges disturbed by rabbits. Not seen there for many years, but early flowering and easily overlooked. See records by Salwey quoted in 2.7.

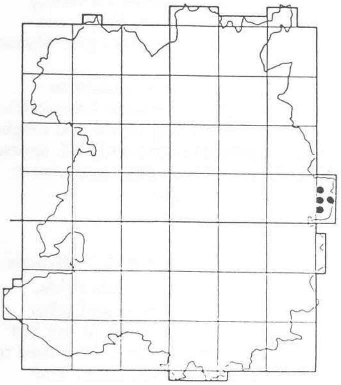
Danish scurvygrass
†Cochlearia danica L.
Extinct
Recorded more than 80 years ago growing on old walls and buildings in parts of Shrewsbury and in Oswestry. Not mentioned in *HSF* (see 2.6, 2.8, 2.11).

Honesty
***Lunaria annua** L.



Roadsides, verges, old gardens, churchyards, disturbed ground etc, always a garden escape but sometimes persistent. Throughout region, scattered but locally frequent.

Sweet alison
***Lobularia maritima** (L.) Desv.



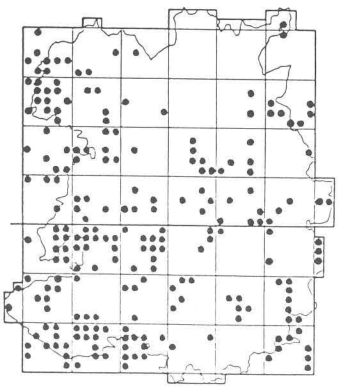
Roadside verges, waste ground and field edges in Albrighton and Cosford area (1976 BRF).

Wall whitlowgrass
***Draba muralis** L.

Known for many years on dry grassy roadside bank and wall at S end of Breidden Hill; also on a wall in Stevens Wood, Cound.

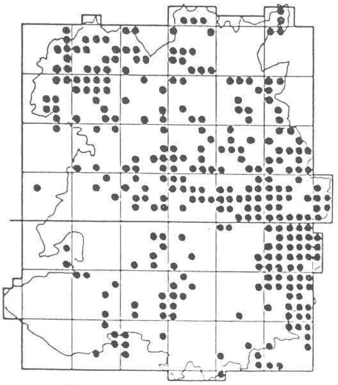
Common whitlowgrass
Erophila verna (L.) Chevall.

Bare patches of ground, rocks, wall tops, thinly vegetated spoil mounds, ant hills and other disturbed ground on dry shallow soils, PN med to poor, base med to rich, neut to calc, open, sunny and exposed. A typical member of the winter ephemeral community on limestone. Ass: *Saxif tri, Aira car, Aphan arv, Sedum acr, Veron arv, Enca vulg, Weis cont.*



Scattered and locally frequent throughout region esp in western hills, but v. rare in NE.
The varieties have not been distinguished in the present survey.

Horseradish
***Armoracia rusticana** P Gaertner, B Meyer & Scherb.

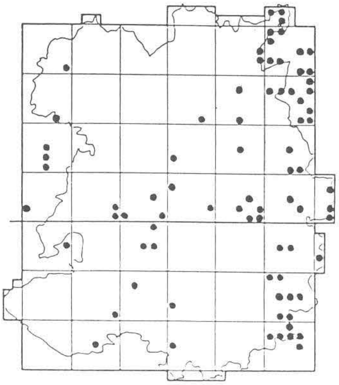


Old gardens, waste ground; rubbish tips and roadside verges (esp near junctions), on damp to dry soils, PN rich , base med to rich, mod acid to calc, sunny. Ass: *Sonch arv, Cirsi arv, Dacty glo, Elymu rep, Rumex obt.* Naturalised and well established away from habitations but probably always of garden origin. Locally throughout region, frequent; abundant in Bridgnorth area and around Oswestry; rare in SW.

Cuckooflower
'Lady's-smock', 'Wild gilliflower'
Cardamine pratensis L.

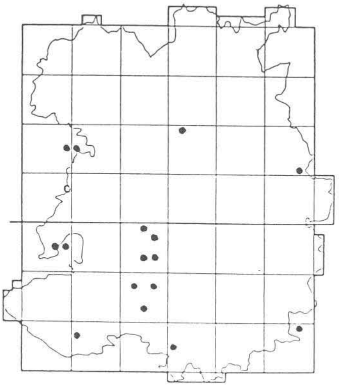
Damp pastures and meadow, fen, stream banks, margins of pools and ditches, on moist to damp often winter-flooded soils, PN poor to rich, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Calth pal, Lychn flo, Rumex aosa, Succi pra, Leont aut, Ranun fla, Ranun acr.*
Widespread and common in suitable habitats throughout region. V. variable genetically and ecologically: a double-flowered form is locally frequent.

Large bitter-cress
Cardamine amara L.



Grassy or scrubby river banks, water-meadows, wet woodland on moist to damp intermittently flooded often alluvial soils, PN med to rich, base med to rich, mod acid to neut, ½ shade. Favoured by mowing or light grazing. Ass: *Calth pal, Carda pra, Ranun acr, Festu pra, Veron bec.*
Scattered and sparse but locally frequent in E of region; v. rare in W and NW.

Narrow-leaved bitter-cress
Cardamine impatiens L.



Stable screes and stony tracks through woodland on dry soils, PN poor to med, base med, mod acid, sun to ½ shade, warm. A vigorous upland species, intolerant of competition but invasive in suitable recently disturbed habitats. Ass: *Allia pet, Geran rob, Poa nem, Mycel mur.*
V. locally frequent in Church Stretton area; rare elsewhere in W and S.

Wavy bitter-cress
Cardamine flexuosa With.

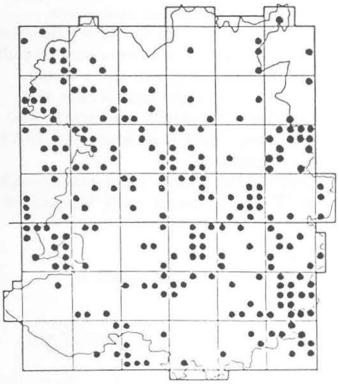
Springs and flushes, stream beds, damp hollows in woodland or grassland, gardens, open but sheltered roadside verges, on wet to damp soils, PN poor to med, base med to rich, mod acid to calc, ½ shade. Poor competitor with taller vegetation, growing best on bare ground or among mosses. Genetically and ecologically variable, one form being typical of the mossy spring and flush community.
Widespread in suitable habitats throughout region.

Hairy bitter-cress
Cardamine hirsuta L.

Wall tops, rocks, stony banks, roofs and yards on v. shallow dry soils (including crevices in concrete or brickwork), PN poor to med, base med to rich, neut to calc, sunny, warm, exposed. Ass: *Eroph ver, Aphan arv, Cymba mur, Poa pra.*
Throughout region frequent in suitable habitats.

Coralroot
***Cardamine bulbifera** (L.) Crantz.
(*Dentaria bulbifera* L.)
Naturalised in grounds of Broncroft Castle near Tugford (1978 MSF).

Winter-cress, yellow rocket
Barbarea vulgaris R.Br.

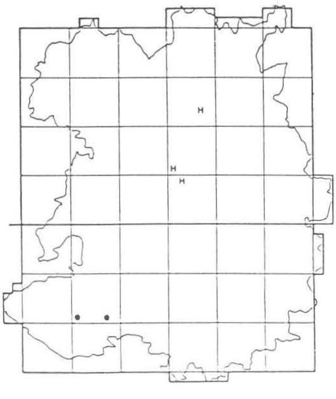


Banks of lowland streams and rivers, ditch-sides, field edges and verges, on moist to damp, winter-wet or flooded soils, PN med to rich, base rich, mod acid to calc, sunny, open, usu on disturbed ground. Ass: *Brass nig, Plant maj, Poa tri, Ranun rep, Rumex obt.*
Frequent except in parts of N and SW.

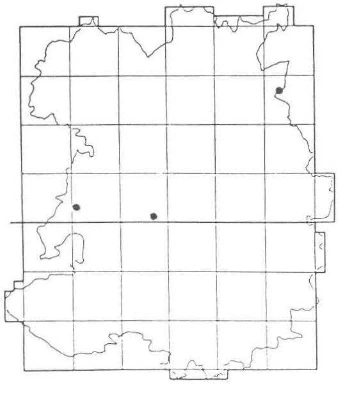
Small-flowered winter-cress
***Barbarea stricta** Andrz.

Recorded by River Clun and on bank of drained Clun pool (1980 TEM). Formerly known from a few sites in Shrewsbury area, and in *ABF* from SJ 50 and SO 77.

(Map: next column)



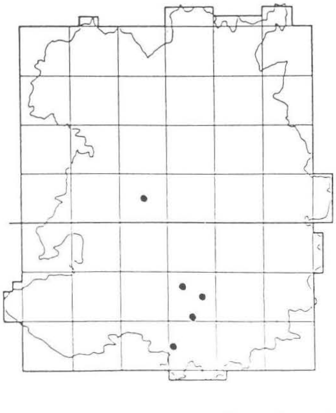
Medium-flowered winter-cress
***Barbarea intermedia** Boreau



V. rare: field edges and hedgebanks; near Worthen; Longnor; Soudley.

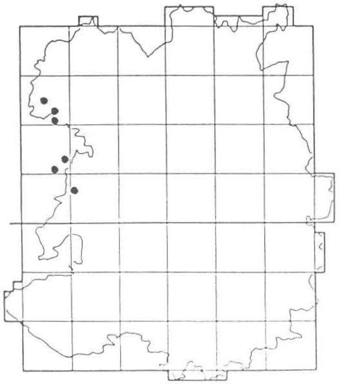
American winter-cress
***Barbarea verna** (Miller) Ascherson
On roadside waste ground above R Severn at Madeley Wood (1982 BRF).

Garden arabis
***Arabis caucasica** Schlecht.



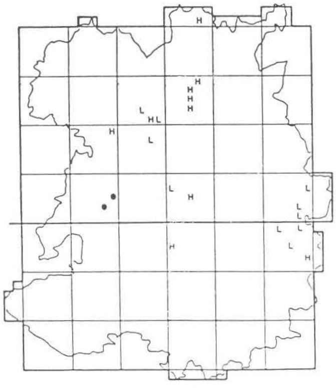
V. local: naturalised on old walls and quarry floors; chiefly in S of region.

Hairy rock-cress
Arabis hirsuta (L.) Scop.



Crevices and ledges on limestone cliffs and other calc rocks in dry sunny exposed situations. Ass: *Saxif tri, Thymu pra, Helia num, Asple tri, Scabi col.*
V. rare: limestone in Oswestry uplands; Breidden Hill.

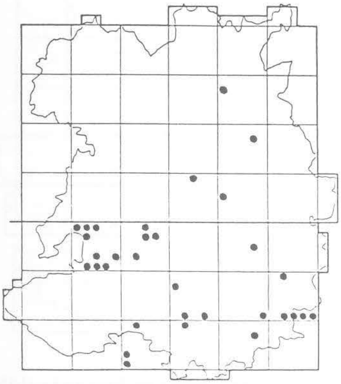
Tower mustard
***Arabis glabra** (L.) Bernh.
(*Turritis glabra* L.)



Roadside casual recorded from Minsterley area (1976 DD). Formerly known from many sites around Shrewsbury; Hodnet; Shifnal-Bridgnorth area.

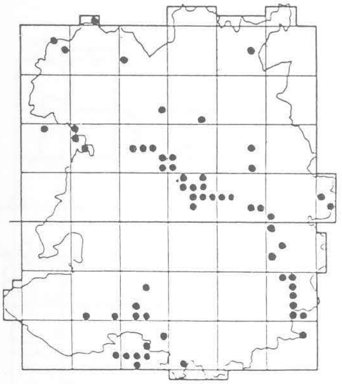
Water-cress, summer water-cress
Nasturtium officinale R.Br.
(*Rorippa nasturtium-aquaticum* (L.) Hayek)
Springs, small streams and ditches in clear clean shallow running water on stony or sandy beds, PN med, base med to rich, neut to alk, unpolluted, sunny, sheltered. Ass: *Veron bec, Apium nod, Menth aqu, Calli* spp, *Myoso sco.*
Locally common throughout region in suitable habitats.

Narrow-fruited water-cress
Nasturtium microphyllum (Boenn.) Reichenb.
(*Rorippa microphylla* (Boenn.) Hyl.)



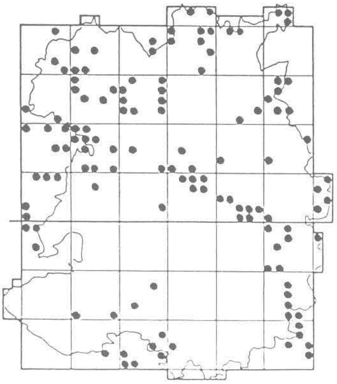
Habitat v. similar to *N. officinale,* but more upland in distribution. Mainly in S of region; under-recorded.
The hybrid *N. microphyllum* × *officinale* has been recorded (FHP).

Creeping yellow-cress
Rorippa sylvestris (L.) Besser



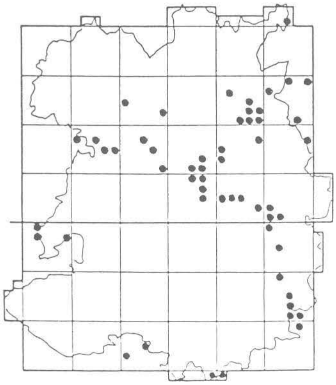
Gently shelving margins of ponds, pools, ditches, streams, rivers, low-lying flooded fields and wasteland, on winter-wet but summer-dry soils, often on bare mud or shingle, sometimes marking high water strandline, PN rich, base med to rich, neut to alk, sunny, sheltered, warm. Tolerant of trampling and some grazing, a vigorous pioneer but intolerant of competition. Can withstand drier conditions than the other two yellow-cress species, and less organic soils. Ass: *Agros sto, Brass nig, Planta maj, Polyg hyd, Poten ans.*
Frequent along valleys of R Severn, R Teme and their lowland tributaries.

Marsh yellow-cress
Rorippa palustris (L.) Besser
(*R. islandica* auct., non Borbás)



Shelving margins of rivers, streams and ponds on winter-wet, summer-damp soil or bare mud, PN rich, base med to rich, neut to alk, sunny, warm, sheltered. Tolerates trampling and some grazing, a bare ground pioneer in similar but rather wetter sites than *R. sylvestris.* Ass: *Agros sto, Brass nig, Myoso aqu, Polyg hyd, Ranun sce.*
Locally frequent in lowlands esp along R Severn and tributaries, but perhaps over-recorded and less common than map suggests.
Records in this region for *R. islandica* should be referred to this species.

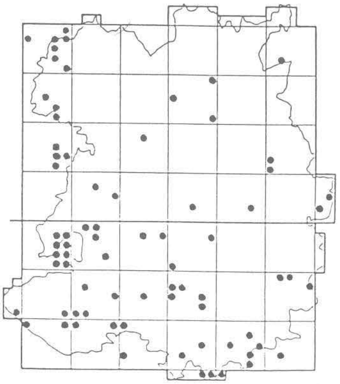
Great yellow-cress
Rorippa amphibia (L.) Besser



Shallow margins of rivers, streams and ponds with variable water level, usu in standing water and never really dry, on mud or silt, PN rich, base rich, neut to alk, sun to ½ shade, warm, sheltered. Found in the lowest and most aquatic riverside zone of the three *Rorippa* species. Ass: *Phala aru, Apium nod, Epilo hir, Myoso pal, Solan dul, Veron bec.*
Frequent along R Severn and its NE lowland tributaries: sparse along R Teme: almost all records lie below 200ft contour.
The hybrid **R.** × **anceps** (Wahlenb.) Reichenb. (*R. amphibia* × *sylvestris*) is quite common along the Severn. It is the only hybrid *Rorippa* known to occur in this region.

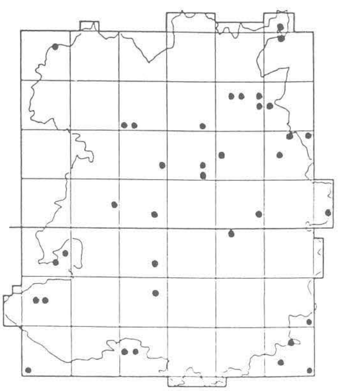
Aubretia
*__Aubrieta deltoidea__ (L.) DC.
Naturalised on Munslow school wall (1979 MSF).

Dame's-violet
*__Hesperis matronalis__ L.



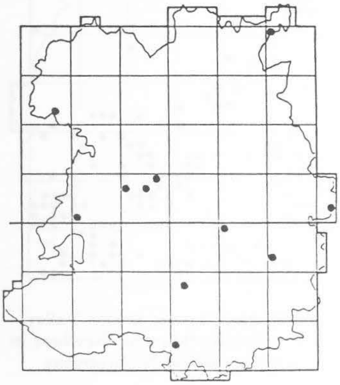
Well established escape from cottage gardens on roadsides and waste ground on damp to dry loamy or stony soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade. Vigorous and persistent where not overgrown by shrubs and trees. Ass: *Senec squ, Centr rub, Anthr syl, Dacty glo, Aegop pod.*
Scattered but locally frequent throughout W and S, sparse in N Shropshire plain.

Treacle mustard
*__Erysimum cheiranthoides__ L.



Sparse to locally frequent in arable lowland, rare to absent elsewhere.

Wallflower
'Churl'
***Cheiranthus cheiri** L.



Long established and naturalised on old walls, and occasionally on rock outcrops, in crevices or mortar courses, or at back edge of pavements, deep-rooted in thin often humus poor soil, dry, PN rich, base rich, calc, warm, sunny, usu sheltered, ungrazed. A thermophilous plant typical of ancient buildings and town walls, but also escaping from gardens on to more recent sites. Ass: *Cymba mur, Parie jud, Centr rub, Antir maj, Senec squ.*
Widespread but sparse esp in lowland towns and villages: under-recorded.

Garlic mustard
'Jack-by-the-hedge'
Alliaria petiolata (Bieb.) Cavara & Grande

Hedgebanks and roadside verges, waste and disturbed ground on damp to dry soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. Favoured by digging or disturbance; persisting for several years along line of underground cables etc. Ass: *Galiu apa, Arrhe ela, Elymu rep, Urtic dio, Lamiu pur, Ballo nig, Stell med.*
Widespread and common in suitable sites throughout region.

Hedge mustard
Sisymbrium officinale (L.) Scop.

Farmyards, roadside verges, field edges, rubbish tips and disturbed ground on dry soils, PN rich, base med to rich, mod acid to calc, sunny, open and warm. Ass: *Ballo nig, Horde mur, Bromu ste, Malva syl.*
Scattered throughout region esp near habitations.

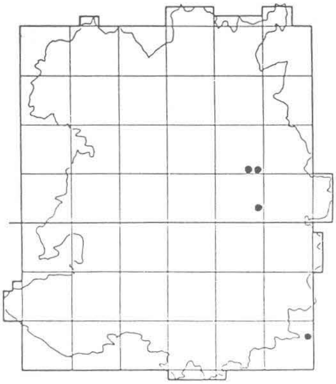
London rocket
***Sisymbrium irio** L.

Casual: recorded once, by Miss E R Lloyd, on a roadside at Oswestry.

Eastern rocket
***Sisymbrium orientale** L.

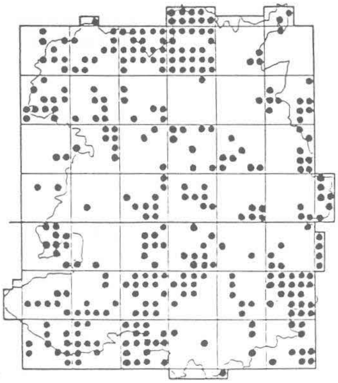
Casual or established on disturbed ground and gardens. Recorded from Allscott sugar beet factory and localities outside Shropshire in extreme SE.

Tall rocket
***Sisymbrium altissimum** L.



Casual or established on waste ground and railway banks in Telford area and outside Shropshire in extreme SE.

Thale cress
Arabidopsis thaliana (L.) Heynh.

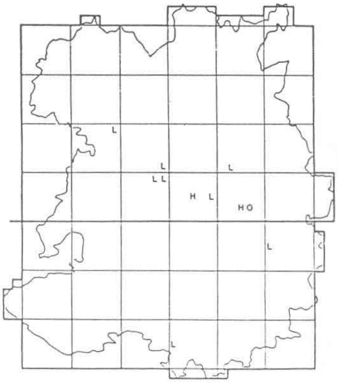


Bare stony or sandy places in grassland, quarries, waste ground, railway tracks, drives, pits and wall tops, on shallow dry soils, PN med, base poor to rich, acid to calc, sunny, warm. A pioneer annual, intolerant of compet. Ass: *Eroph ver, Poa ann, Arena ser, Sagin ape, Capse bur.*
Throughout region, frequent and locally abundant.

Gold-of-pleasure
***Camelina sativa** (L.) Crantz

Reported from Shrewsbury and Upton Cressett as single plants but not confirmed. *LFS* has one record from cornfield at Hoard's Park near Bridgnorth and quotes from Revd E Williams's MSS "Among flax, common".

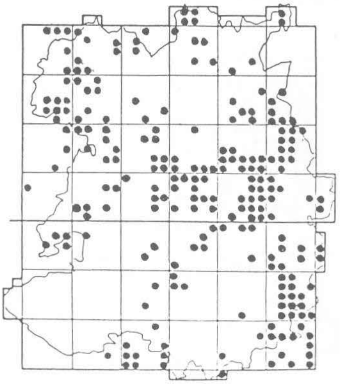
Flixweed
Descurainia sophia (L.) Webb ex Prantl



Formerly frequent in lowland from Shrewsbury to Bridgnorth and Ludlow. Found at two sites in Oswestry during August 1984 (BD and MW).

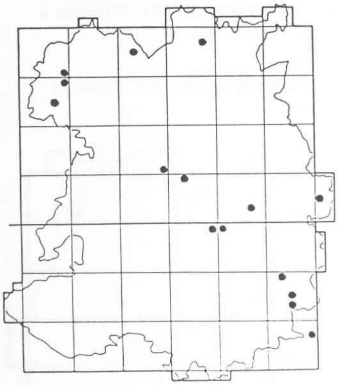
MIGNONETTE FAMILY
RESEDACEAE

Weld, Dyer's rocket
Reseda luteola L.



Railway tracks, sidings and embankments, tips, quarry floors and disturbed ground on v. stony usu calc soils, dry, PN med, base med to rich, neut to calc, open and sunny. A pioneer species often associated with ballast or dumped stone chippings. Ass: *Senec squ, Chame ang, Allia pet, Linar vul, Cardu nut, Epilo cil, Verba tha.*
Locally frequent to common esp in the lowland; sparse in hills; v. rare in Clun Forest area.

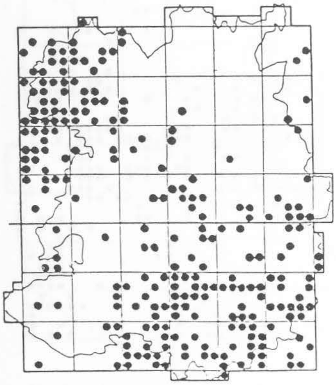
Wild mignonette
Reseda lutea L.



Railway tracks and sidings, quarry floors, cinders and ashes, disturbed waste ground and demolished buildings on dry, PN poor to med, base rich, calc soils, sunny and warm. Ass: *Aira car, Arena ser, Chaen min, Epilo cil, Linar vul, Senec vis, Vulpi myu.*
Much less common than weld: locally frequent in Oswestry area and Lower Severn Valley; Wenlock Edge quarries; rare elsewhere in lowlands.

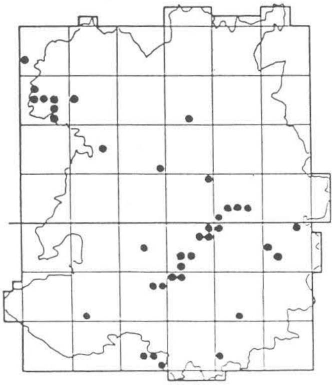
VIOLA FAMILY
VIOLACEAE

Sweet violet
Viola odorata L.



Woodland glades, rides and margins, open scrub and hedgebanks on damp to dry clay or loamy soils, PN med, base med to rich, mod acid to calc, ½ shade to shade, sheltered. Tolerant of light grazing. In flower and leaf earlier than its taller associates. Ass: *Primu vul, Glech hed, Arum mac, Allia pet, Fraga ves, Galiu apa.*
Locally frequent to abundant in Oswestry uplands and neighbouring lowland and throughout SE quarter of region; sparse in Central hills and Clun Forest; v. rare in NE lowland.

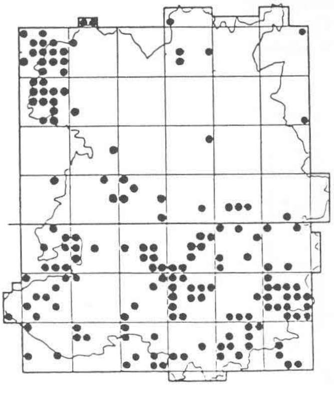
Hairy violet
Viola hirta L.



Edges and glades of open woodland and scrub and on rough grassy banks, usu on limestone or on dry to damp clay or loam, PN poor to med, base med to rich, neut to calc, sun to ½ shade. Persisting among taller vegetation but intolerant of heavy grazing. Ass: *Brach syl, Primu ver, Primu vul, Liste ova, Sanic eur, Orchi mas, Helia num.*
Locally common on the Oswestry limestone uplands and Wenlock Edge; sparse and much less common than sweet violet elsewhere.

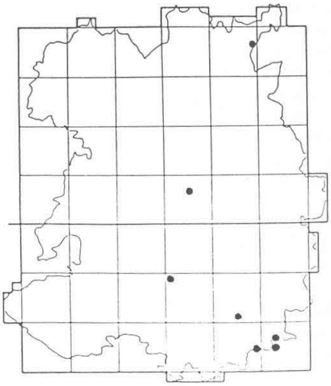
Common dog-violet, Common violet
'Cuckoo's-shoe'
Viola riviniana Reichenb.
Woods, open scrub, hedgebanks, old grassland and grassy heath, tracks and waste ground on damp to dry soils, PN poor to med, base poor to rich, acid to calc, sunny to shade, tolerant of grazing. Extremely variable genetically and in its ecological requirements. Ass: *Geran rob, Poten ste, Primu ver, Silen dio, Hyaci non, Oxali ace.*
The ssp. **minor** has been noted in hill pastures.
Widespread and frequent to abundant throughout region at all altitudes.

Early dog-violet, Pale wood-violet
Viola reichenbachiana Jordan ex Boreau
Open woodland and scrub, hedgebanks and edges of paths mainly on limestone or other basic rocks or dry soils, PN poor to med, base med to rich, mod acid to calc, ½ shade to shade. The most shade-tolerant of the violets, flowering after sweet violet but before common dog-violet. Ass: *Viola riv, Primu vul, Oxali ace, Ranun fic, Mercu per, Arum mac.*
Frequent and locally common in Oswestry uplands; Wenlock Edge – Clee hills area; Lower Severn Valley: sparse to locally frequent elsewhere in hill country: rare on N Shropshire plain.



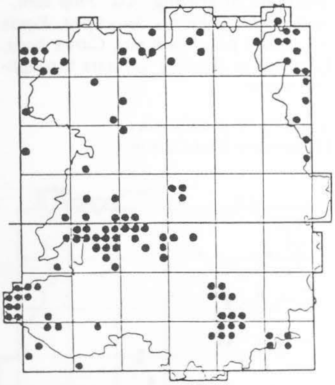
The hybrid *V. reichenbachiana* × *riviniana* has been recorded from Craig Sychtyn (1979) by EDP and PB.

Heath dog-violet
Viola canina L.



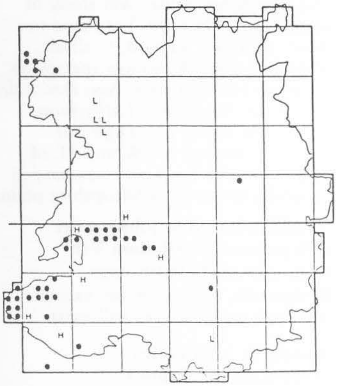
Heathy ground or open woodland, sometimes on rotten tree stumps or old tussocks, on damp to moist peaty soil, PN poor, base poor, acid to mod acid, sun to ½ shade. Ass: *Antho odo, Luzul mul, Molin cae, Poten ere, Plata bif, Genis ang.*
V. local though probably under-recorded: Betton Moss (now gone); Lower Cound; Wetmoor; Wyre Forest (several sites). Leighton did not distinguish this species, but it has probably decreased in recent decades.

Marsh violet
Viola palustris L.
Marshy scrub, flushes, wet grassland, edges of hillside runnels, springs and streams on moist to damp clay or peat, PN poor, base med, mod acid to neut, sun to ½ shade. Fairly tolerant of grazing and trampling. Ass: *Lotus uli, Carex ech, Carex pcea, Achil pta, Luzul mul, Succi pra, Calth pal.*



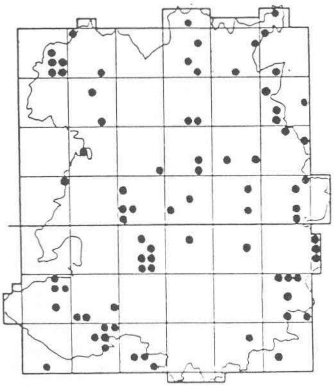
V. locally frequent to abundant in Central hills; Clee hills area; Oswestry uplands; N Shropshire mosses: locally frequent in Clun Forest and NW plain. Still quite common where suitable habitats survive but severely reduced in area by agricultural drainage, ploughing and reseeding of pastures.

Mountain pansy
Viola lutea Hudson



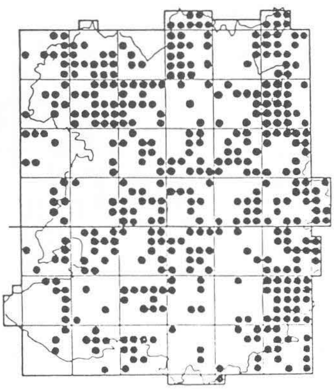
Old species-rich grassland and grassy banks on dry often stony, sandy or loamy soils, with a thin layer of raw humus, PN poor, base poor to med, acid to mod acid, open and sunny. Tolerant of heavy grazing and favoured by occasional applications of lime, but intolerant of more intensive management. Ass: *Festu ovi, Galiu sax, Veron off, Pimpi sax, Hiera pil, Poten ere, Polyg ser, Botry lun, Ophio vul.*
Locally frequent on Oswestry upland; Central hills; western Clun Forest. Now confined to hill country though formerly recorded on lowland heath (Knockin Heath). In the 1940s it was still possible to walk from Ratlinghope via Squilver and Shelve to Bromlow Callow through field after field washed pale with mountain pansies. Now declining rapidly under agricultural pressure: several solid dots on the map have become open circles in the 1980s.

Wild pansy
'Three-faces-under-a-hood'
'Two-faces-under-the-sun'
Viola tricolor L.



Bare patches in grassland, rocky banks, sand pits, arable fields and paths, on dry stony or sandy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, intolerant of compet with vigorous grasses. Ass: *Crepi cap, Epilo cil, Artem vul, Digit pur, Vicia sat, Arrhe ela.*
Throughout region, sparse but v. locally frequent.

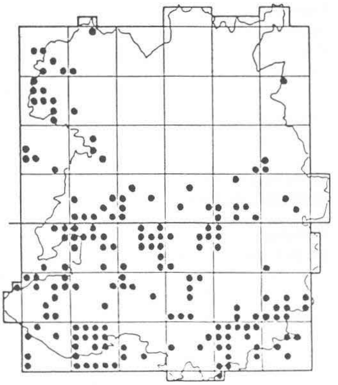
Field pansy
Viola arvensis Murray



Still a common weed of arable fields and other cultivated land on dry to damp soils, PN rich, base med to rich, mod acid to calc, sunny and open. Ass: *Papav rho, Sinap arv, Matri rec, Myoso arv, Polyg per.*
Frequent to locally abundant throughout region, though less common in extreme SW.

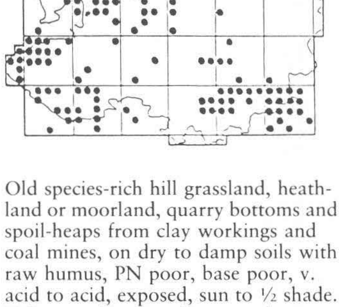
MILKWORT FAMILY
POLYGALACEAE

Common milkwort
Polygala vulgaris L.



Species-rich grassland and open scrub often on limestone or other basic rock, on dry rather shallow soils, PN poor to med, base med to rich, neut to calc, sunny, warm and open. Also, but more rarely, found in base-rich flushes, by runnels, on wet heath. Tolerant of grazing and of mod compet with taller plants. Ass: *Thymu pra, Hiera pil, Pimpi sax, Clino vul, Hyper hir, Origa vul.*
Locally frequent on Oswestry uplands, Central hills, Wenlock Edge, southern parts of Clun Forest and Clee hills area and Lower Severn Valley. Sparse elsewhere in hill country and apparently absent from the plain.

Heath milkwort, Thyme-leaved milkwort
Polygala serpyllifolia J.A.C. Hose

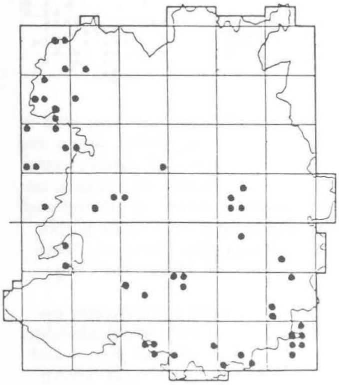


Old species-rich hill grassland, heathland or moorland, quarry bottoms and spoil-heaps from clay workings and coal mines, on dry to damp soils with raw humus, PN poor, base poor, v. acid to acid, exposed, sun to ½ shade. Tolerant of grazing but not of compet from tall grasses. Typical of grazed turf on impoverished lime-deficient soils. Ass: *Galiu sax, Veron off, Festu ovi, Pedic syl, Poten ere, Stach off, Nardu str.*
Locally frequent on Central hills, Clun Forest and Clee hills area; Wyre

Forest; Telford: v. sparse on N Shropshire mosses.
Plants on clay spoil and quarry floors appear distinct, forming small flat patches with condensed leafy shoots and pale blue-green flowers.

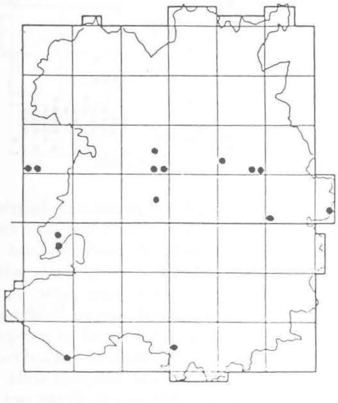
ST JOHN'S-WORT FAMILY
HYPERICACEAE

Tutsan
Hypericum androsaemum L.



Woodland edges, rides and clearings, shaded hedgebanks, on damp to moist sometimes stony clays or loams, PN poor to med, base med, mod acid, ½ shade, sheltered and cool. Seldom abundant where it occurs and intolerant of grazing, often beside rocky rills. Ass: *Dryop dil, Polys set, Athyr fil, Luzul syl, Hyper pul, Lathy mon, Solid vir.*
Sparse and v. locally frequent in W and S hill country and Wyre Forest. Very rare in the lowlands.

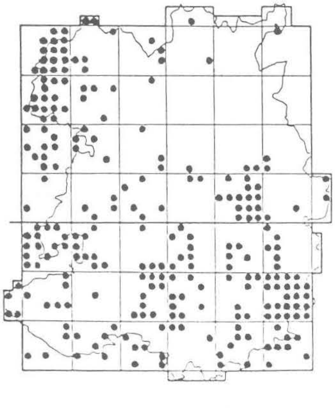
Rose-of-Sharon
***Hypericum calycinum** L.



Naturalised near former habitations in roadside scrub or open woodland on dry to damp soils, PN med, base med, mod acid to neut, ½ shade. Spreading to form extensive pure patches, a strong competitor with native woodland plants. Sparse and probably under-recorded: Welshpool; Shrewsbury area; Telford; Albrighton; Ludlow.

Perforate St John's-wort
Hypericum perforatum L.
Woodland edges, open scrub or coarse grassland, hedgebanks and verges, quarries, railway tracks and other disturbed ground, often associated with limestone, on dry soils, PN poor to med, base med to rich, mod acid to calc, sun to ½ shade. A vigorous and strongly competitive plant of scrubland margins, but not a serious agricultural weed with us as it is in the western USA. V. variable genetically and in ecological requirements. Ass: *Brach syl, Clino vul, Galiu cru, Galiu ver, Arrhe ela, Dacty glo, Vicia sep.*
Throughout region frequent to abundant in suitable habitats.
The hybrid *H. maculatum* × *perforatum* (**H. × desetangsii** Lamotte) has been recorded at a number of sites.

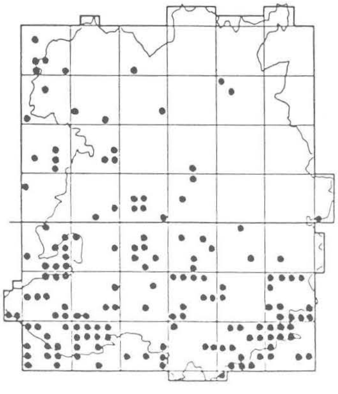
Imperforate St John's-wort
Hypericum maculatum Crantz
(*Hypericum dubium* Leers)



Hedgebanks, scrub and edges of open woodland. Generally on damp clay or loamy soils with a variable water-table, PN med, base med to rich, acid to neut, sunny. Will stand occasional mowing but intolerant of grazing. Ass: *Vicia cra, Filip ulm, Lathy pra, Carex hir, Juncu inf.*
Frequent to locally common in Oswestry upland; Wenlock Edge – Clee hills area; Lower Severn Valley; sparse to locally frequent elsewhere in hill country; v. local on Shropshire plain.

Square-stalked St John's-wort
Hypericum tetrapterum Fries
Banks of streams, ditches and canals, damp roadside verges and hollows in fields on wet to damp sometimes winter-flooded soils, PN med, base med, mod acid to neut, sun to ½ shade, intolerant of grazing. Ass: *Filip ulm, Juncu inf, Lychn flo, Succi pra, Equis pal, Galiu pal, Stach pal, Carex pcea.*
Frequent in suitable habitats throughout region.

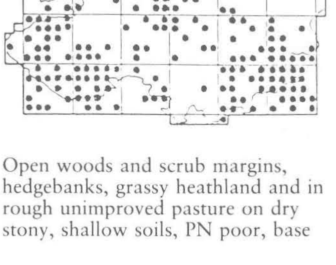
Trailing St John's-wort
Hypericum humifusum L.



Tracks and bare ground in open woodland and grassy heaths on dry but sometimes winter-wet stony or sandy soils, PN poor, base med to poor, acid to mod acid, ½ shade, sheltered, cool. A pioneer species on compact but light soils. Ass: *Desch fle, Galiu sax, Veron off, Lathy mon, Coryd cla, Poten ere, Digit pur.*
Locally common in SW and SE of region: locally frequent elsewhere in uplands; sparse in N Shropshire plain.

Toadflax-leaved St John's-wort
†Hypericum linarifolium Vahl
Once recorded (1919) near Bridgnorth, now probably extinct although suitable sites still exist.

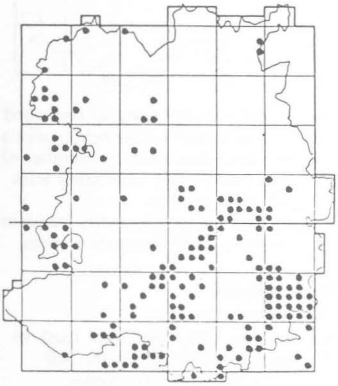
Slender St John's-wort
Hypericum pulchrum L.



Open woods and scrub margins, hedgebanks, grassy heathland and in rough unimproved pasture on dry stony, shallow soils, PN poor, base

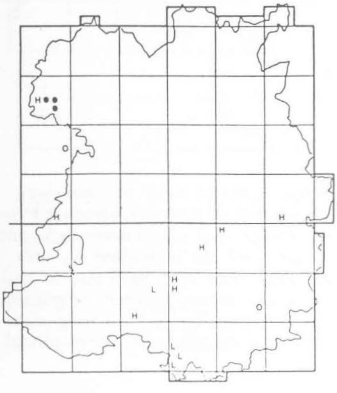
poor to rich, acid to calc, sun to ½ shade and warm. Fairly indifferent to soil base status, a member of the short-herb grassland edge communities. Tolerant of occasional mowing or light grazing but a poor competitor with taller plants. Ass: *Desch fle, Holcu mol, Callu vul, Erica cin, Teucr sco, Lathy mon, Luzul pil.*
Locally common in Oswestry uplands; Wenlock Edge area; extreme SW and SE of region: locally frequent elsewhere in uplands: sparse in lowlands.

Hairy St John's-wort
Hypericum hirsutum L.



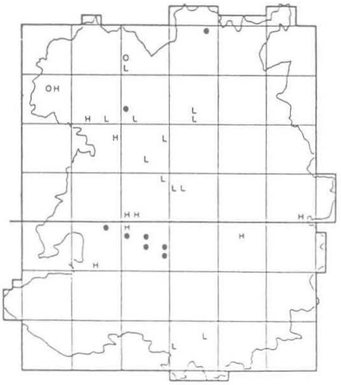
In open woodland, scrub and coarse grassland, often associated with limestone on dry to damp soils, PN poor to med, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered. A strong competitor except on rich soils. Intolerant of grazing or frequent mowing but favoured by disturbance. Typical of tall-herb verge communities esp on shallow soils over rocks. Ass: *Brach syl, Elymu can, Agrim eup, Clino vul, Campa tra, Galiu odo.*
Locally common in Oswestry uplands; Wenlock Edge area; southern border of region: sparse to rare elsewhere.

Pale St John's-wort
Hypericum montanum L.



Limestone cliffs and quarry floors, bare patches in grassland on shallow dry soils, PN poor, base rich, calc, sunny and exposed. A rare but characteristic member of the open tall-herb community on limestone. Ass: *Scabi col, Pimpi sax, Inula con, Rosa pim, Helia num, Leuca vul.*
Now v. rare: apparently confined to a few sites on limestone hills near Oswestry (Blodwel Rock and Whitehaven quarry): formerly frequent along Wenlock Edge and around Ludlow with isolated records elsewhere.

Marsh St John's-wort
Hypericum elodes L.

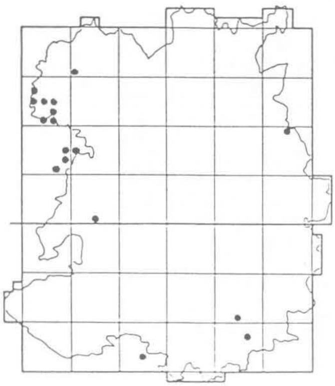


Flushes, springs, runnels, pool sides and wet peaty ground usu with some water movement in soil, PN poor, base med to poor, acid to mod acid, sunny often sheltered. Typically associated with *Sphagnum* and other mosses. Ass: *Potam pol, Drose rot, Juncu bul, Myoso sec, Anaga ten, Hydro vul, Spha recu, Spha palu, Spha subn, Aula palu.*
V. locally frequent in Central hills: v. rare in N Shropshire plain: Brown Moss; Boreatton Park. Formerly widespread and frequent in NW lowland. Severely decreased owing to loss of habitat.

SUN-ROSE FAMILY
CISTACEAE

Common rock-rose
Helianthemum nummularium (L.) Miller
(*H. chamaecistus* Miller)

Rock outcrops, ledges and pasture, typically on limestone but also on basic igneous rocks (e.g. dolerite), on dry, shallow, fine soil or in rock crevices, PN poor to med, base rich, neut to calc, sunny, exposed, warm. Tolerant of grazing, a poor competitor with taller plants. V. rarely associated with *Calluna, Erica cinerea* (e.g. on Craig Breidden), but takes their place as dwarf shrub on limestone. Ass: *Asple tri, Scabi col, Inula con, Sangu min, Thymu pra.*



V. locally frequent in Oswestry uplands and Breidden hills: rare elsewhere and apparently absent from Wenlock Edge.

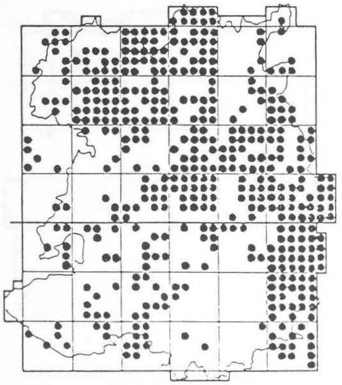
WATERWORT FAMILY
ELATINACEAE

Six-stamened waterwort
Elatine hexandra (Lapierre) DC.
Shallow water at edge of meres. V. rare: Bomere pool; Newton mere. First British record 1798 Revd E Williams at Bomere.

PINK FAMILY
CARYOPHYLLACEAE

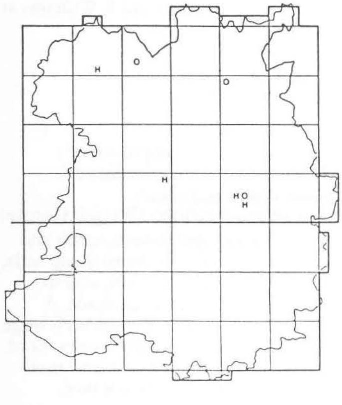
Red campion
'Scalded-apple', 'Ragged robin', 'Jesus' blood', 'Thunder-flower'
Silene dioica (L.) Clairv.
(Melandrium rubrum (Weigel) Garcke)
Hedgebanks, open woods, scrub and disturbed ground on dry to damp soils, PN med, base poor to rich, acid to neut, (rarely calc), sun to shade. A vigorous member of the tall-herb verge community but generally intolerant of grazing or flooding. Ass: *Hyaci non, Mercu per, Stell hol, Holcu mol, Ranun fic, Poa nem.*
Throughout region except at highest altitudes, frequent to abundant in suitable sites.
A v. distinct form with hemispherical leafy cushions and almost stemless flowers occurs on mining spoil and fine scree on the limestone hills near Oswestry. It may be tolerant of heavy metals (copper?) or grazing by rabbits, but it does not fully retain its dwarf habit in cultivation.

White campion
Silene alba (Miller) E.H.L. Krause
Melandrium album (Miller) Garcke)
Sandy roadsides, arable fields and waste ground on light dry freely-drained soils, PN med to rich, base med to rich, mod acid to calc, warm, sunny. Grows best in open communities, not persisting long in dense vege-



tation. Ass: *Sinap arv, Papav rho, Chrys seg, Sonch arv, Crepi cap, Matri rec.*
Frequent to abundant in lowland parts of region including vales in hill country: rare in uplands.
The hybrid *S. alba* × *dioica* is common on intermediate sites where parents meet.

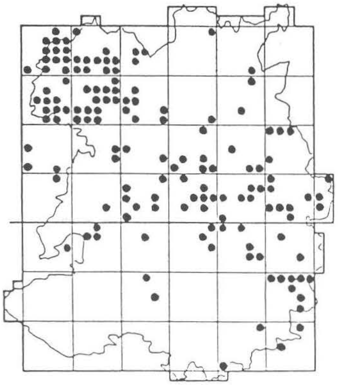
Night-flowering catchfly
†Silene noctiflora L.
(*Melandrium noctiflorum* (L.) Fries)



Arable fields, probably extinct: last seen near Welshampton in 1959 (Francis Rose and CAS). Formerly recorded at a few other sites in lowland but never common.

Bladder campion
'Bird eggs'
Silene vulgaris (Moench) Garcke
(*Silene cucubalus* Wibel)
Roadsides and other grassy places or disturbed ground, on dry sandy soils, PN med, base med to rich, mod acid to calc, sunny, open. Favoured by disturbance or occasional mowing. Ass: *Trise fla, Festu rub, Arrhe ela, Hyper per, Knaut arv, Centa sca, Silen alb.* Like white campion predominantly lowland in distribution but much less abundant.

(Map: next column)



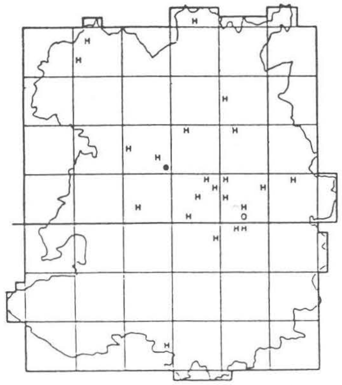
Small-flowered catchfly
Silene gallica L.
Occurs sporadically in sandy fields, tracks, gateways and roadside verges on light acid soils, favoured by disturbance, not persisting long in closed vegetation. Ass: *Sperg arv, Scler ann, Viola arv, Crepi cap, Vicia sat, Ornit per.*
V. rare: Wolf's head, Knockin Heath. First found by EMR 1960.

Nottingham catchfly
Silene nutans L.
On New Red Sandstone rocks and along sandstone paths in v. dry dusty shallow soil, PN poor, base poor and acid. V. rare: known for centuries and still surviving in Grotto Hill in Hawkstone Park. (1970+ PHO, 1976 EAW).

Ragged-Robin
Lychnis flos-cuculi L.
Fens, flushes, damp meadows and wet hollows in grassland. Generally associated with a high winter watertable, PN med, base med to rich, mod acid to calc, sunny. Tolerant of grazing and some trampling. Ass: *Calth pal, Succi pra, Ranun fla, Juncu art, Carex pcea, Carex ova, Galiu pal, Achil pta.*
Frequent throughout region.

Sticky catchfly
$Lychnis viscaria L.
(*Viscaria vulgaris* Bernh.)
Not in v c 40
Rock outcrops, cliff ledges and open scrub on steep S facing hillsides on shallow dry soils, PN med, base med, mod acid to acid, sunny, exposed. A member of a v. distinctive drought-tolerant steppe community on sun-baked slopes; central European affinities. *Lychnis viscaria* is peculiar in its relatively high phosphate demand and its intolerance of lime. Ass: *Umbil rup, Teucr sco, Helia num, Erica cin, Hiera pel, Veron spi.*
V. rare: long known (an Edward Lhwyd record, see 2.3) and still surviving on more or less inaccessible parts of Craig Breidden (v c 47).

Corncockle
Agrostemma githago L.

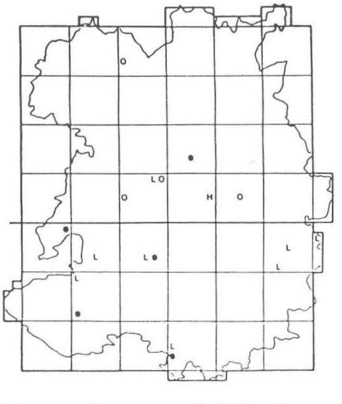


Occasionally reappearing in disturbed ground and former arable fields, once a common and characteristic member of the weed community associated with rye and other cereals.
V. rare: Shrewsbury; formerly frequent in drier parts of N Shropshire plain.

Deptford pink
†Dianthus armeria L.
Recorded in *LFS* from canal bank in the parish of Burford; on the hill towards Cleobury; near Ketley.

Pink
***Dianthus plumarius** L.
Long established on walls of Ludlow castle and Haughmond Abbey, but not seen recently.

Maiden pink
Dianthus deltoides L.

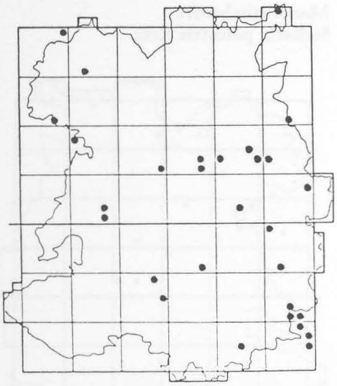


Warm rocky or stony hillsides, lane banks and old quarries, often on basic igneous or hard sedimentary rocks and in open turf, on v. shallow dry soils, PN poor, base med, mod acid to acid, sunny and warm. Tolerant of grazing and trampling but not a strong competitor. A member of the transitional community between the pioneer annuals and closed perennial grassland. Ass: *Festu ovi, Rumex alla, Jasio mon, Thymu pra, Pimpi sax, Sedum for, Hiera pil, Galiu ver, Lepid het.* Rare: Haughmond Hill (Downton); Hazler Hill; near Priestweston; Clun; recent records at the Burgs, Bayston Hill (1948); Earls Hill (1958). Scattered records in *LFS* but not much commoner then than now.

Cowherb
**Vaccaria hispanica* (Miller) Raüschert
(*V. pyramidata* Med.)

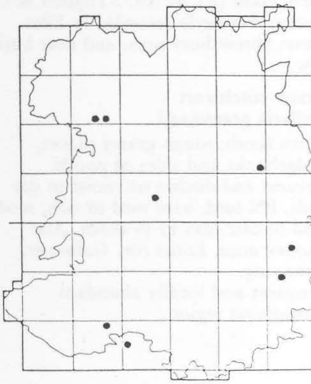
Casual and not long persisting, perhaps from birdseed in gardens. Beckbury (1979); Bucknell (1963); Tickwood (1929 *RBF*).

Soapwort
***Saponaria officinalis** L.



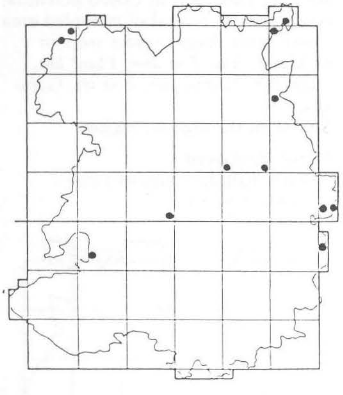
Established and sometimes fairly persistent on grassy verges, banks, quarries and railway embankments, on dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, tolerant of occasional mowing. Ass: *Anthr syl, Arrhe ela, Elymu rep, Stach syl, Glech hed, Cirsi arv.*
Locally frequent in extreme SE: occasional records in NW, mid, and S of region.

Field mouse-ear
Cerastium arvense L.



Bare patches in grassland, sunny banks, and edges of fields on shallow dry soils, PN poor, base med, mod acid, sunny and warm. Tolerant of drought and fairly persistent in tall grasses. Ass: *Arrhe ela, Ceras sem, Myoso dis, Cytis sco, Trifo str, Vicia sat, Anthr cau.*
Throughout, but v. sparse.

Snow-in-summer
***Cerastium tomentosum** L.



Roadside banks, walls, railway banks and old gardens on dry sandy or stony soils. Naturalised and persisting in several localities in N and E of region.

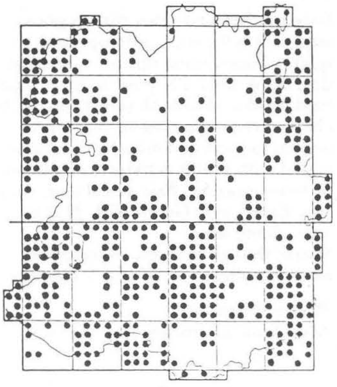
Common mouse-ear
Cerastium fontanum ssp. **glabrescens** (G.F.W. Meyer) Salman *et al.*
(*C. vulgatum* auct; *C. holosteoides* Fries; *C.f.ssp.triviale* (Link) Jalas)

Grassland, verges, hedgebanks, open scrub, disturbed and waste ground, stream and ditch banks on moist to dry soils, PN poor to rich, base poor to rich, acid to calc, sun to ½ shade. Tolerant of grazing but v. compet with all but most vigorous neighbours. Ass: *Plant lan, Belli per, Hypoc rad, Prune vul, Agros cap, Loliu per, Poa tri, Festu rub.* V. variable genetically and of wide ecological tolerance.
Frequent to abundant throughout region.

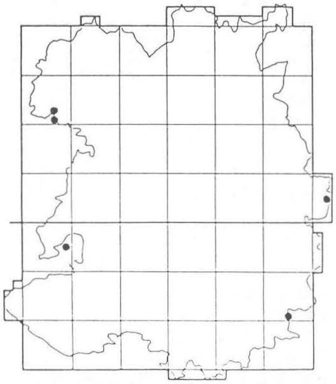
Sticky mouse-ear
Cerastium glomeratum Thuill.

Farmyards, gateways, bare patches and edges of fields, roadsides and rubbish tips on damp or winter-wet often compact soils, PN rich, base med to rich, mod acid to neut, sunny. V. tolerant of trampling and manuring but a poor competitor with perennial grasses. Ass: *Poa ann, Plant maj, Matri mat, Gnaph uli, Loliu per, Juncu buf, Stell med, Polyg avi.*
Frequent to locally abundant throughout uplands: sparse to locally frequent in N Shropshire plain.

(Map: next column)

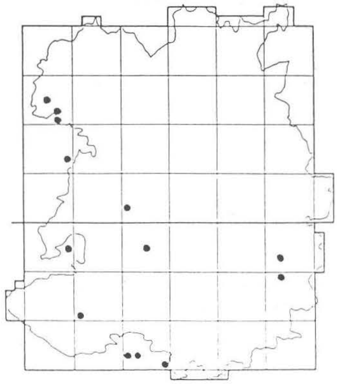


Sea mouse-ear
Cerastium diffusum Pers.
(*C. atrovirens* Bab.; *C. tetrandrum* Curtis)



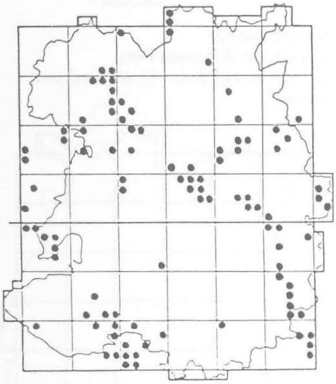
Bare patches and among short turf on limestone outcrops, and on railway ballast or cinders on dry soils, PN poor, base rich, neut to calc, sunny and warm. Ass: *Aphan arv, Arena ser, Desma rig, Erodi cic, Veron arv.*
Rare: Shrewsbury rly sidings (1959 D E Allen *Proc BSBI* 1962); Albrighton goods yard (1976 BRF); Llanymynech Hill; Severn Valley Railway NW of Arley; old quarry north of Hurdley.

Little mouse-ear
Cerastium semidecandrum L.



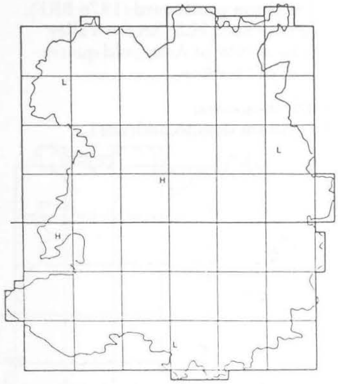
Bare patches and open turf in grassland, ant hills, rock outcrops and quarry floors, mine tips on v. shallow, dry, stony soils, PN poor to med, base med, mod acid to acid, sunny, warm. A characteristic member of the winter annual pioneer community, often associated with rabbit activity and tolerant of heavy grazing. Ass: *Teesd nud, Aira pra, Eroph ver, Geran mol, Myoso ram, Acino arv.*
Sparse though perhaps overlooked: mainly confined to W and S uplands.

Water chickweed
Myosoton aquaticum (L.) Moench



Intermittently flooded river and stream banks, on moist clay or silty alluvium, PN rich, base rich, neut to calc, sun to ½ shade, sheltered, intolerant of grazing. Ass: *Tanac vul, Phala aru, Brass nig, Polyg hyd, Stach pal.*
Locally frequent along banks of R Severn, R Teme and their lowland tributaries: V. rare in uplands.

Wood stitchwort
†Stellaria nemorum L.

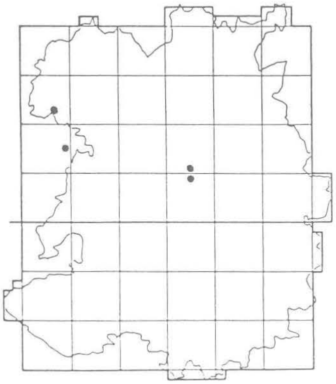


Possibly extinct, or overlooked. Recorded from several sites in *LFS* and *HFS:* near Oswestry; Lilleshall Abbey; Marrington (1901); Boiling Well, Linney and Papermills, Ludlow; Sharpstones, Cardington (1877); and with unlocalised records in *ABF* for SO 28, 37 and 38.

Common chickweed
Stellaria media (L.) Vill.

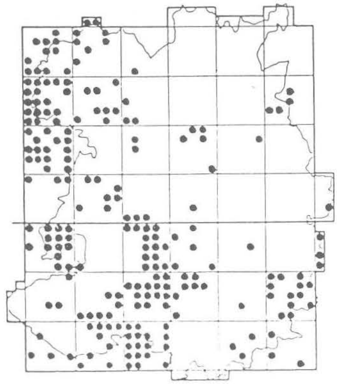
Farmyards, dung heaps, gateways, bare trampled areas in grassland, disturbed ground, roadsides, rubbish tips, arable fields and gardens on moist to dry soils, PN rich, base med to rich, mod acid to calc. The most widespread annual weed of nutrient-rich soils but not long persistent in closed perennial vegetation. V. typical of trampled area where cattle shelter under trees in parkland. Ass: *Poa ann, Plant lan, Loliu per, Lamiu pur, Poa tri, Galiu apa.*
Abundant throughout region.

Lesser chickweed
Stellaria pallida (Dumort.) Piré
(*S. apetala* auct.)



Recorded from rocky outcrops on Llanymynech Hill and by Rodney's Pillar on Breidden Hill: dry grassland in Deer Park, Attingham.

Greater chickweed
Stellaria neglecta Weihe

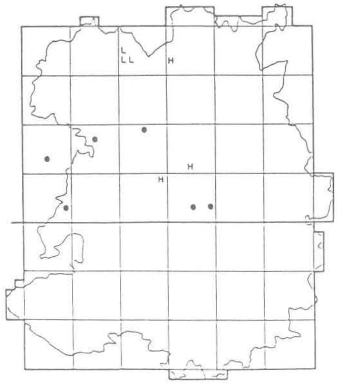


Hedgebanks, woodland margins, open scrub and edges of fields on damp, PN rich, base rich soils. Ass: *Hyaci non, Silen dio, Galiu apa, Elymu rep, Arrhe ela, Ranun fic.*
Frequent to locally abundant in parts of upland: local or sparse in lowlands.

Greater stitchwort
'Devils corn', 'Old lads corn', 'Maygrass', 'Bogey's playthings', 'Crackers', 'Our/my Lady's needlework', 'Pop bladders', 'Skitty witty'.
Stellaria holostea L.

Hedgebanks, woodland margins and clearings, open scrub and edges of fields on dry loamy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade. Particularly characteristic of the upper part of a bank between the hedge and the roadside verge or ditch. Ass: *Holcu mol, Hyaci non, Silen dio, Moehr tri, Mercu per, Arum mac.*
Frequent to abundant throughout region in suitable sites.

Marsh stitchwort
Stellaria palustris Retz.

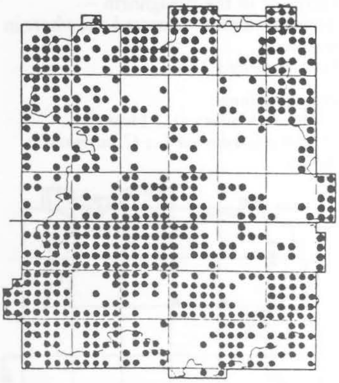


Fens, wet hollows and marshy ground in fields on moist to damp but winter-wet peat or clay soils, PN med, base med to rich, mod acid to calc, sunny but sheltered. Ass: *Juncu inf, Oenan aqu, Carda pra, Ranun rep, Filip ulm, Menth aqu.*
Rare: The Hayes, Loton estate; Wern near Pool Quay; Marton Pool near Chirbury (not seen recently); field by Hem Flash (v c 47 1977 Hignett & Lacey). Formerly recorded in Ellesmere; Shrewsbury area; and near Ludlow.

Lesser stitchwort
Stellaria graminea L.

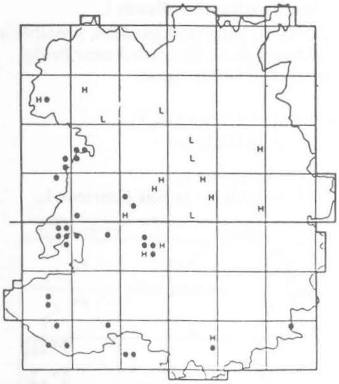
Open scrub, rough grassy places, hedgebanks and sides of ponds, streams and ditches on moist to dry soils, PN med, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Rumex aosa, Lotus cor, Galiu ver, Centa nig.*
Frequent and locally abundant throughout region.

Bog stitchwort
Stellaria alsine Grimm



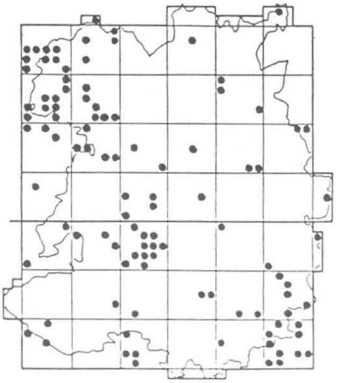
Wet hollows in grassland, rutted trackways in woods and marshy shallow ditches and springs on wet to moist clay or peaty soils, PN poor, base poor, acid, sunny to ½ shade. Often in extensive pure patches, a poor competitor but fairly tolerant of taller overhanging vegetation. Ass: *Juncu buf, Carex ova, Carex dem, Ranun fla, Myoso lax, Monti fon, Lythr por.*
Frequent to abundant in suitable places throughout the uplands and around N Shropshire meres and mosses: locally frequent elsewhere in lowlands.

Upright chickweed
Moenchia erecta (L.) P. Gaertner, B. Meyer & Scherb.



Bare patches and rock outcrops on grassy hillsides, ant hills and rabbit burrows on shallow, dry soils, PN med to rich, base poor to med, acid to mod acid, sunny, warm and exposed. A member of the pioneer winter annual community of hill pastures and closely associated with rabbit activity. Ass: *Teesd nud, Aira pra, Eroph ver, Geran mol, Myoso ram, Acino arv.*
Locally frequent in western part of uplands. Formerly more widespread and extending well into lowland parts of region.

Annual pearlwort
Sagina apetala Ard.
(incl. **S. ciliata** Fries)

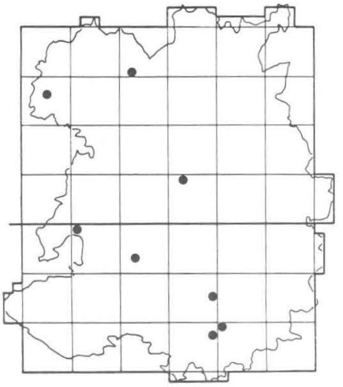


Bare open places, roads, tracks, walls, cracks in weathered concrete and paving stones, limestone chippings and quarry floors on dry to damp sandy or stony soils, PN med, base poor to rich, mod acid to calc, open and sunny. A small pioneer plant very tolerant of trampling. Ass: *Poa ann, Capse bur, Coron squ, Senec vul, Bryu arge, Eurh conf.*
Locally frequent throughout S and W esp Oswestry uplands and Lower Severn Valley. Sparse but probably overlooked.

Procumbent pearlwort
Sagina procumbens L.
Garden paths and tracks, cracks in concrete and pavements, trampled places in fields and bases of walls, also in springs and flushes on wet to dry but winter-wet soils, PN poor to rich, base med to rich, mod acid to calc, sun to ½ shade. A common and persistent weed of gardens and trampled soils, also found wild in the short turf community of hillstream springs, tolerant of trampling and grazing. Ass: *Poa ann, Capse bur, Coron squ, Senec vul, Monti fon, Agros sto, Myoso sec.*
Throughout region: frequent to locally abundant in suitable habitats.

Knotted pearlwort
Sagina nodosa (L.) Fenzl

Short fen, stream sides, flushes and runnels on wet to moist peaty or clay soils, PN poor to med, base med to rich, mod acid to calc, sunny. V. tolerant of grazing and trampling (which probably favours it), but a poor competitor with tall grasses. Ass: *Belli per, Trigl pal, Anaga ten, Juncu art, Carex pcea.*
Rare, mainly upland: Trefonen; Crosemere; Cronkhill; Ashes Hollow; Brown Clee above Cockshutford; Titterstone Clee above Cleeton St Mary.
(Map: next column)



Fine-leaved sandwort
$**Minuartia hybrida** (Vill.) Schischkin
(*M. tenuifolia* (L.) Hiern)
Not in v c 40.
Reported (1978 MCC) but unconfirmed, from roadside hedgebank and sandstone ledges at Jacob's Ladder near Trimpley (v c 37).

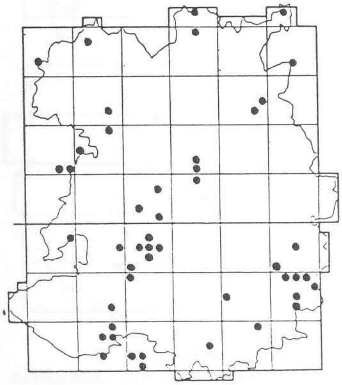
Three-nerved sandwort
Moehringia trinervia (L.) Clairv.
Woodland and plantations, scrub, hedges and shady banks on dry soil, PN med to rich, base med, acid to neut, shade to ½ shade, sheltered. Intolerant of grazing and of compet with more vigorous woodland herbs. Often on disturbed ground under trees. Ass: *Digit pur, Poa nem, Glech hed, Ranun fic, Galiu apa.*
Frequent throughout region.

Thyme-leaved sandwort
Arenaria serpyllifolia L.
Bare stony ground, quarry floors (usu limestone), railway ballast, track-ways and building rubble on dry soils, PN poor to med, base rich, neut to calc, sunny, warm. A common pioneer species. Ass: *Aphan arv, Eroph ver, Erodi cic, Veron arv, Saxif tri.*
A. leptoclados (Reichenb.) Guss. has not been consistently distinguished in the current survey and its ecological preferences are inadequately known.

Mossy sandwort
***Arenaria balearica** L.
Naturalised on garden wall at Broncroft Castle (1979 MSF).

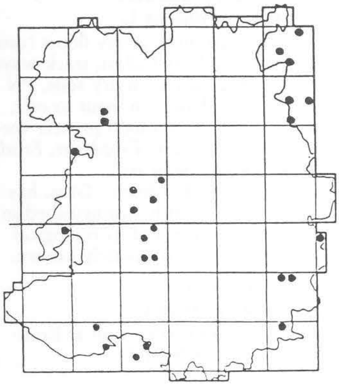
Corn spurrey
'Mountain flax'
Spergula arvensis L.
Sandy arable fields and waste places on dry to winter-wet sandy or stony soils, PN poor to med, base poor to med, acid to neut, sunny, sheltered. An 'old' cornfield weed, less common under intensive than traditional farm management. Ass: *Scler ann, Anaga arv, Viola arv.*
Frequent throughout region in suitable sites, esp in the upland.

Sand spurrey
Spergularia rubra (L.) J & C Presl



Open patches on grassy slopes and rocky banks in dry shallow stony or sandy soil, PN poor, base med to poor, acid to mod acid, warm, sunny and exposed. A poor competitor with grasses. A member of a distinct community intermediate between annual pioneer stage and closed grassland. Ass: *Trifo str, Teesd nud, Scler ann, Moenc ere, Festu ovi, Poa sub.*
Locally frequent in Central hills (e.g. Motte of Pulverbatch Castle); Bridgnorth area; Bucknell area: sparse elsewhere in uplands: v. rare in N Shropshire plain, but a feature of edges of lawns in Attingham Park by house.

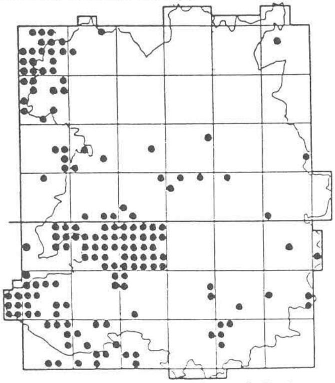
Annual knawel
Scleranthus annuus L.



The typical form is an arable weed on poor, light, dry or winter-wet soil, PN poor, base med to poor, acid to mod acid, sunny, warm. Ass: *Sperg arv, Viola arv, Anaga arv, Myoso arv, Matri rec.*
Local in Central hills: sparse and probably overlooked elsewhere. Much decreased within past few decades through modern farming methods.
S. polycarpos (L.) Thell. is a distinct species or ssp. found on bare patches in open rocky grassland on v. shallow soils of similar constitution. Ass: *Galiu ver, Thymu pra, Festu ovi, Hiera pil, Lepid het, Aphan arv.*
Kempster's Hill near Crew Green (1978 CAS); Middleton near Priestweston (1982 JMR).
First recorded at Bayston Hill by C C Babington (1837).

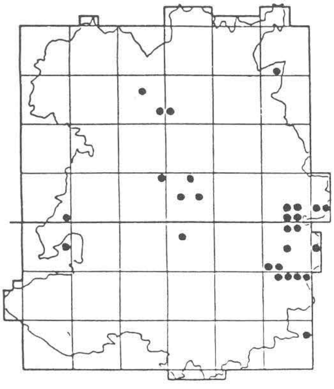
PURSLANE FAMILY
PORTULACACEAE

Blinks
Montia fontana L. agg.



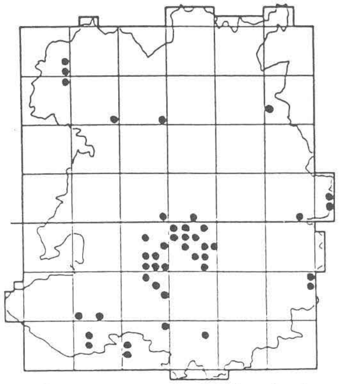
Springs, shallow runnels and flushes esp
on open hillsides, on wet to moist, loamy soils, PN poor to med, base med to rich, mod acid to calc, sunny, sheltered, tolerant of grazing and trampling but not of compet with taller plants. Ass: *Carda fle, Lythr por, Myoso sec, Stell als, Ranun fla, Phil font, Marc poly.*
Locally abundant in Central hills and Oswestry uplands: frequent elsewhere in hill country: sparse in N Shropshire plain.
Subspecies have not been mapped in the present survey. Ssp. **variabilis** Walters is recorded in *CSABF* for SJ 33 & SO 49; ssp. **amporitana** Sennen for SJ 21 & SO 57: both of these and ssp. **chondrosperma** (Fenzl) Walters are recorded for SJ 32 & 40.

Springbeauty
***Montia perfoliata** (Donn ex Willd.) Howell
(*Claytonia perfoliata* Donn ex Willd.)



A garden escape, well naturalised on hedgebanks, verges and in woods. Frequent in the Bridgnorth – Albrighton area: scattered elsewhere in lowlands.
First recorded 1867.

Pink purslane
***Montia sibirica** (L.) Howell
(*Claytonia sibirica* L.; *C. alsinoides* Sims)



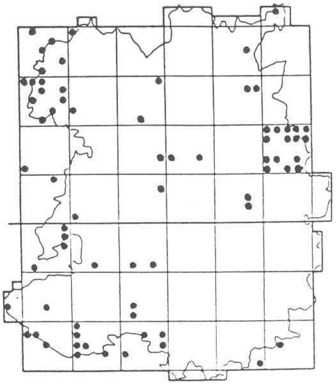
Garden escape, naturalised on hedgebanks, verges and in woods. Frequent and spreading in an area approx centred on Chatwall and Cardington; around Oswestry; locally frequent near Clun: scattered records elsewhere.
First recorded Burwarton 1897.

PIGWEED FAMILY
AMARANTHACEAE

Common amaranth, Pigweed
***Amaranthus retroflexus** L.
Casual in fields and gardens, possibly a birdseed plant. Recorded near Bridgnorth and Culmington.

GOOSEFOOT FAMILY
CHENOPODIACEAE

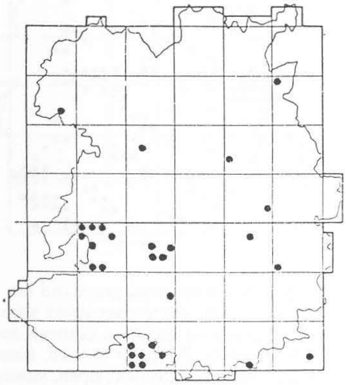
Good-King-Henry
***Chenopodium bonus-henricus** L.



Formerly grown as a pot-herb and well naturalised on roadsides, around cottages and farms, and the edges of fields on damp to dry soils, PN rich, base

med to rich, mod acid to neut, sunny, sheltered. Ass: *Urtic dio, Rumex obt, Loliu per, Poa tri, Plant maj, Matri mat.*
Frequent in Oswestry uplands: local elsewhere in western hill country: sparse in N Shropshire plain.

Many-seeded goosefoot
Chenopodium polyspermum L.



Arable fields, rubbish tips, waste ground, disturbed roadsides, old railway tracks on damp to dry soils, PN rich, base med to rich, mod acid to neut, sunny. Ass: *Fallo con, Polyg per, Urtic ure, Senec vul, Sonch asp, Cheno alb.*
Locally frequent in Central hills and Leintwardine area: sparse elsewhere and absent from much of lowland.

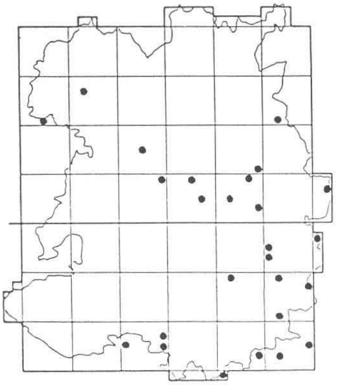
Fat-hen
'Johnny o'Needle'
Chenopodium album L.
Arable fields, rubbish tips, waste ground and gardens on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny. A common weed of cultivation esp with non-cereal crops such as sugarbeet, potatoes and rhubarb. Ass: *Polyg per, Agros gig, Sonch arv, Fallo con, Senec vul.*
Frequent throughout region, esp lowland.

Fig-leaved goosefoot
***Chenopodium ficifolium** Sm.
Reported, but unconfirmed, from 3 or 4 localities in the S and E of region.

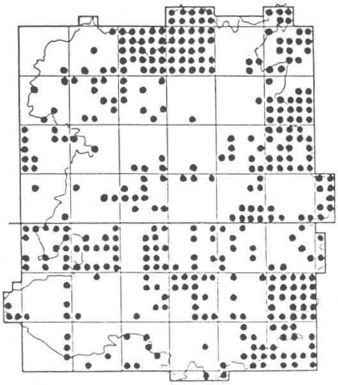
Maple-leaved goosefoot
Chenopodium hybridum L.
Two records from edges of region at Trench near Overton (1977 FHP), and at Lindridge Farm at Tuckhill (1980 WAT).

Red goosefoot
Chenopodium rubrum L.

Arable fields, farmyards, manure heaps, market gardens, rubbish dumps and waste ground on v. fertile damp soil, PN rich, base rich, mod acid to calc, sunny, associated with intensive cultivation.
Scattered localities in centre and SE of region.
(Map: next column)

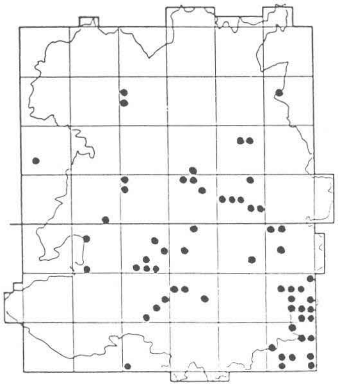


Common orache
Atriplex patula L.



Rubbish tips, waste ground, gardens, middens, arable fields esp among root or leaf crops, on disturbed often heavy and damp soils, PN rich, base med to rich, mod acid to calc, sunny. A vigorous ruderal pioneer on fertile soils. Ass: *Polyg lap, Polyg per, Rumex obt, Sonch asp, Sonch ole.*
Widespread and frequent throughout region, esp N and E.

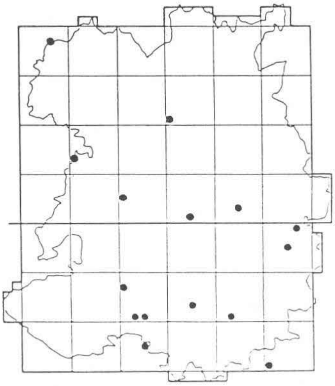
Spear-leaved orache
Atriplex prostrata Boucher ex DC.
(*A. hastata* auct., non L.)



Roadside verges, field edges, rubbish dumps, river and canal banks and disturbed ground, on damp to moist soils, PN rich, base rich, mod acid to calc, sunny. Ass: *Polyg avi, Plant maj, Cardu aca, Capse bur, Cirsi arv, Poa ann.*
Locally frequent around Church Stretton and in Lower Severn Valley: scattered elsewhere.

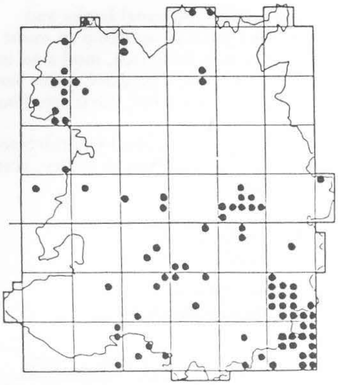
LIME FAMILY
TILIACEAE

Large-leaved lime
Tilia platyphyllos Scop.



Ancient mixed woodland, hedges, parks and gardens on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to shade. Probably an important member of the mixed oak woodland covering the more fertile areas of lowland and fringes of upland before the agricultural clearances of the New Stone Age and Bronze Age. Ass: *Querc rob, Fraxi exc, Ulmus gla, Prunu avi, Sorbu tor.* Almost certainly native in its woodland sites in the Habberley Valley and on the crags of Earl's Hill Nature Reserve; in Tickwood; and in Downton Gorge. Planted and occasionally naturalised elsewhere. 1941 *RBF* has an interesting entry on this species, describing individual trees in the area around Wyke and Benthall Edge and a large tree "apparently wild on Bridgnorth Golf Links". The author (G. Potts) speculates that *T. platyphyllos* may well be native along Wenlock Edge and at Benthall Edge.

Small-leaved lime
Tilia cordata Miller
Old deciduous woodland notably over limestone and basic rocks on damp to dry soils, PN med, base med to rich, mod acid to calc, most often occurring as scattered individuals in woods v. occasionally in abundance both as maiden trees and as coppice. Ass: *Querc rob, Fraxi exc, Sorbu tor, Ulmu gla, Acer cam, Taxus bac.*

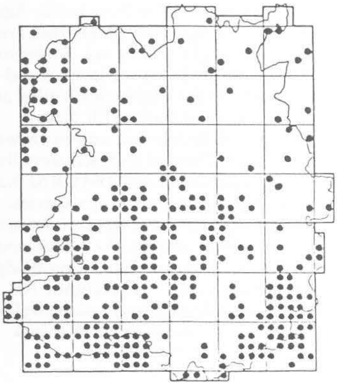


Almost certainly native in its woodland localities such as Blodwel Wood; Wenlock Edge woodlands; Severn Valley woodlands from Tickwood down to Wyre Forest. Much commoner than large-leaved lime in the wild, but less common than the hybrid (see below) as a planted tree.

Lime
Tilia × vulgaris Hayne
(*T. × europaea* auct.: *T. cordata × platyphyllos*)
The most extensively planted of the limes throughout the region. May also possibly occur wild, where the two parents grow together in ancient woodland.

MALLOW FAMILY
MALVACEAE

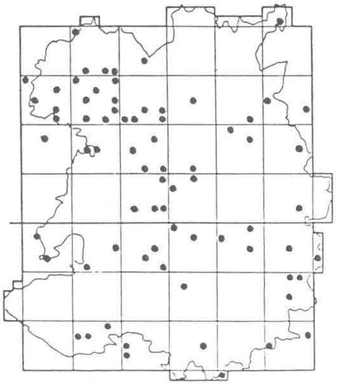
Musk mallow
Malva moschata L.



Warm grassy banks, verges, pastures and edges of scrub on damp to dry loams, PN med to rich, base med, mod acid to neut, open, light and sunny. Tolerant of mod grazing or mowing. Ass: *Arrhe ela, Galiu cru, Geran pyr, Linar vul, Lathy pra, Vicia sat.*
Frequent to locally abundant throughout W and S of region: sparse in NE

Common mallow
'Thunderbolt', 'Shoes and stockings'
Malva sylvestris L.
Roadside verges and hedge banks, farmyards, waste and disturbed ground on dry to damp soils, PN rich, base med to rich, mod acid to calc, sunny and warm. Ass: *Bromu ste, Ballo nig, Sisym off, Lamiu pur.*
Frequent throughout region.

Dwarf mallow
Malva neglecta Wallr.



Limestone rock ledges, bare patches in grassland, roadsides and waste ground, on shallow dry stony soils, PN poor to med, base rich, mod acid to calc, sunny, exposed, tolerant of grazing and mowing but not of compet with vigorous grasses. Ass: *Sedum acr, Erodi cic, Galium ver, Stell pall, Saxif tri, Thymu pra, Desma rig.*
Locally frequent in NW lowland: sparse elsewhere.

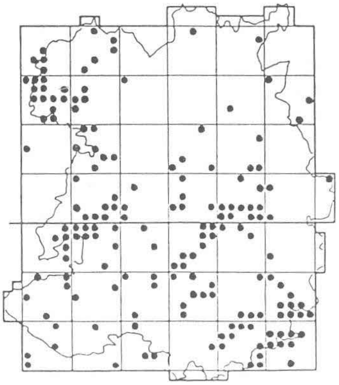
Small mallow
***Malva pusilla** Sm.
Damp muddy farmyard at the Waen, Knockin. Ass: *Rumex obt, Urtic dio, Poten ans, Poa ann, Plant maj, Matri mat.*

FLAX FAMILY
LINACEAE

Flax
***Linum usitatissimum** L.
Formerly a cultivated crop, occasionally reappears but perhaps as a birdseed plant. Beckbury (1979 WEH); Betton Moss cottage (1980 PMB). A record for **L. bienne** Miller at Venus Bank sandpit, Cross Houses (1961 *TCSVFC*) is in fact *L. usitatissimum* (specimen in **SHY**).

Perennial flax
†**Linum perenne** L. ssp. **anglicum** (Miller) Ockendon
Reported as a birdseed plant from Shrewsbury; not confirmed, may have been previous species.

Fairy flax
Linum catharticum L.

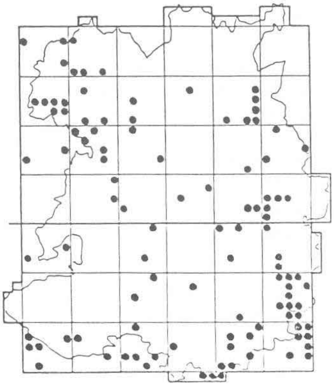


Herb-rich unimproved grassland on dry sometimes winter-wet stony soils and in limestone quarries, cuttings and embankments, PN poor to med, base med to rich, neut to calc, open, sunny, often surprisingly abundant as a small annual among perennials but usu in short turf, tolerant of grazing but not of compet with taller plants. Ass: *Briza med, Primu ver, Stach off, Helia num, Origa vul, Polyg vul.*
Locally frequent in uplands esp on limestone and other basic rocks, sparse in lowland.

Allseed
†**Radiola linoides** Roth
Probably extinct for many years: last recorded from Haughmond Abbey *RBF* 1939. Earlier records from Shawbury Heath; Uckington Heath; Priors Halton, Ludlow; quarry opposite Poughnhill; Rudge Heath.

GERANIUM FAMILY
GERANIACEAE

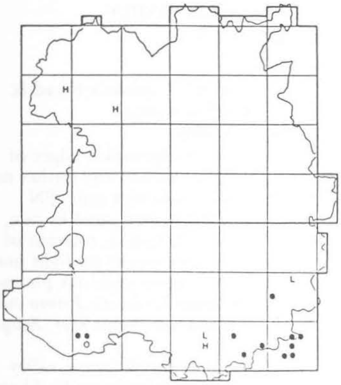
Meadow crane's-bill
Geranium pratense L.



Species-rich roadside verges and old

meadows on damp loam or clay, PN med to rich, base rich, mod acid to calc, sheltered, sunny, tolerant of annual mowing, light grazing. A species of former hay meadows. Ass: *Lathy pra, Alope pra, Phleu pra, Ranun acr, Leuca vul, Vicia cra.* Locally frequent in extreme S and SE of region (Severn and Teme valleys): sparse elsewhere.

Wood crane's-bill
Geranium sylvaticum L.



Glades and clearings in old woodland, hedgebanks and roadside verges, often near streams, on moist to damp loams or clays, PN med, base med to rich, mod acid to neut, sheltered, sun to ½ shade, intolerant of heavy grazing. Ass: *Vicia sep, Rumex aosa, Filip ulm, Galiu cru, Antho odo, Valer off.* Probably native and v. locally frequent in Wyre Forest and near Bucknell: a few scattered localities elsewhere in Shropshire. Escape from gardens and well naturalised in a few other localities in the S of region. Long known and persistent in its main stations, surprisingly remote from its chief area of distribution in N England and Scotland where it is a characteristic species of herb-rich hay meadows.

French crane's-bill
***Geranium endressii** Gay

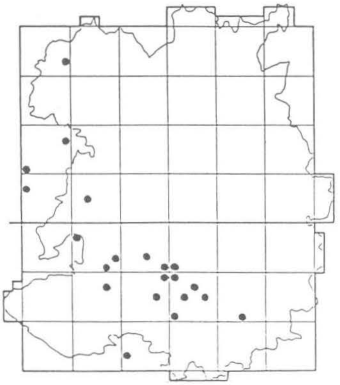
Beside a track on Merrington Green, probably thrown out with garden rubbish but well established (1982 CAS); on a hedgebank at Hengoed (1980 MER).

Knotted crane's-bill
***Geranium nodosum** L.

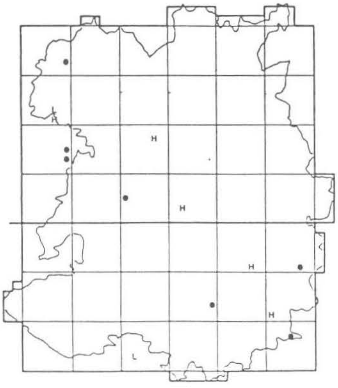
Established on verges and hedgebanks near Benthall Hall (1982 WAT).

Dusky crane's-bill
***Geranium phaeum** L.

Escaped and well established in open woods, roadside verges, churchyards and edges of meadows, generally on damp fertile and base rich soils. Locally frequent in Ludlow, Church Stretton, Bishops Castle area: sparse in W and mid E of region: absent from most of plain.



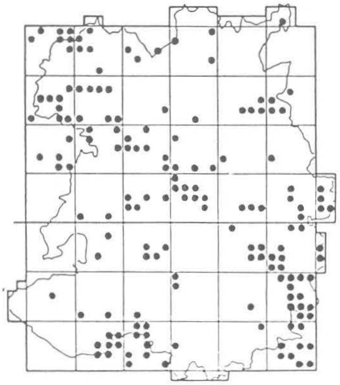
Bloody crane's-bill
Geranium sanguineum L.



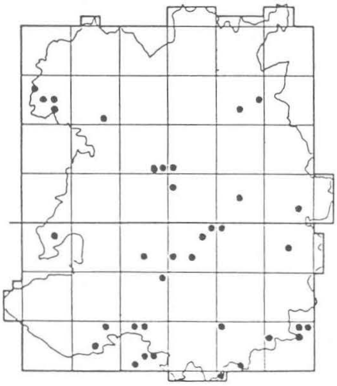
Warm rocky slopes and clearings in woods on steep generally S facing hillsides on dry shallow soils, PN poor, base med to rich, mod acid to calc, sunny, exposed. A thermophilous species characteristic of the woodland edge community which includes wild marjoram. Ass: *Origa vul, Teucr sco, Helia num, Fraga ves, Hyper hir, Umbil rup, Jasio mon, Digit pur.* Native in a v. restricted site in Wyre Forest; on Earl's Hill; and on Craig Breidden (where it is locally abundant). Probably a garden escape elsewhere.

Hedgerow crane's-bill, Mountain crane's-bill
***Geranium pyrenaicum** Burm. fil.

Grassy lowland roadside verges on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny, tolerant of 2 or 3 mowings per year but not heavy grazing, competes successfully with roadside grasses. Leighton says "road-sides; rare": additional records from 1914 (Cound and Eaton Mascott), 1917 (Nobold) and 1918 (Clunton and Alberbury) give evidence of its spread. *RBF* for 1927 says "extending very rapidly around Shrewsbury". Tolerant of modern roadside management methods. Ass: *Allia pet, Alope pra, Arrhe ela, Elymu rep, Anthr syl, Herac sph.*
Locally frequent from NW through centre to SE of region and in parts of SW; sparse in hill country generally and in NE plain.



Long-stalked crane's-bill
Geranium columbinum L.



Rocky outcrops and bare patches in pasture, dry banks, stone walls and quarry floors on limestone, on shallow dry soils, PN poor, base rich, neut to calc, sun to ½ shade, tolerant of mowing or light grazing but a poor competitor with vigorous grasses. Ass: *Arena ser, Leont his, Briza med, Belli per, Sedum acr, Arabi hir.*
Sparse to locally frequent in Oswestry; Shrewsbury; Church Stretton; Bucknell areas; rare elsewhere.

Cut-leaved crane's-bill
Geranium dissectum L.

Roadside verges, edges of fields and disused places in grassland and scrub, on dry to damp soils, PN med to rich,

base med to rich, mod acid to calc, sunny, tolerant of light grazing or mowing. Ass: *Polyg avi, Silen alb, Geran pyr, Sisym off, Elymu rep.*
Frequent throughout region except at higher altitudes.

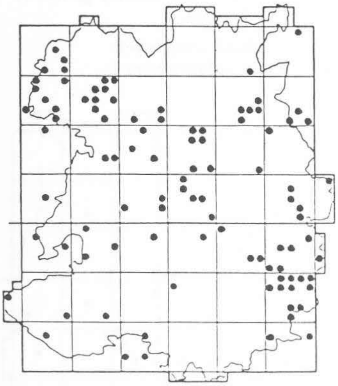
Round-leaved crane's-bill
***Geranium rotundifolium** L.

Leighton wrote "It is completely naturalised in my garden near Shrewsbury where it is now a troublesome weed from seeds taken from a specimen near Bath." Still survives as a weed around Luciefelde House near Bellevue in Shrewsbury (1976 PHO).

Dove's-foot crane's-bill
Geranium molle L.

Roadside verges, field edges, gateways, rubbish tips, ant hills and other disturbed places in grassland on dry soils, PN poor to rich, base med to rich, mod acid to calc, sunny, tolerant of grazing. An ecologically variable species. Ass: *Veron cha, Plant lan, Hypoc rad, Malva mos, Vulpi bro, Hiera pil.*
Frequent throughout region.

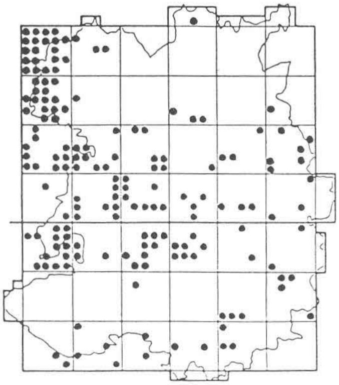
Small-flowered crane's-bill
Geranium pusillum L.



Bare patches and disturbed ground in grassland, on roadside verges and in quarries on dry sandy or stony soils, PN poor, base med to rich, mod acid to calc, sunny, a poor competitor. Ass: *Ceras glo, Crepis cap, Erodi cic, Poa ann, Sagin ape, Senec jac.*
Locally frequent in NW, Central and SE of region: sparse in hill country and NE plain.

Shining crane's-bill
Geranium lucidum L.

Sunny banks and verges, stone walls and edges of screes on dry sandy to loamy soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered, warm. Typical of intermittently disturbed ground, often luxuriant but a poor competitor with persistent perennials, forming a distinct zone between two different communities. Ass: *Umbil rup, Poa nem, Mycel mur, Polyp vul, Geran rob, Chaer tem.*



Abundant in NW; frequent to locally abundant in W and Central part of region (a garden weed in Belle Vue, Shrewsbury); sparse elsewhere and absent from NE plain.

Herb-Robert
'Dragon's blood', 'Squinter pip'
Geranium robertianum L.

Woodland, scrub, hedgebanks, gardens, sides of paths and disturbed ground on dry to damp soils, PN med to rich, base med to rich, mod acid to calc, ½ shade to shade, intolerant of grazing and compet with taller plants but a common pioneer on fertile soils in sheltered places. Ass: *Epilo mon, Viola riv, Glech hed, Galiu apa, Lapsa com, Primu vul.*
Frequent to abundant in suitable habitats throughout region.

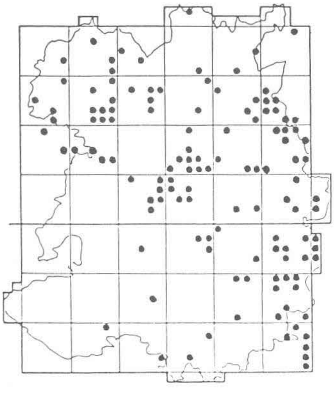
Sea stork's-bill
†Erodium maritimum (L.) L'Hér.

Probably extinct. Formerly recorded from dry sandy or stony ground at several places in the Bridgnorth area (last recorded in 1916).

Musk stork's-bill
***Erodium moschatum** (L.) L'Hér.

Three plants in sand quarry near Dorrington (1980 BRF). Formerly recorded from several places near Shrewsbury and Wellington areas.

Common stork's-bill
Erodium cicutarium (L.) L'Hér.
ssp. **cicutarium**



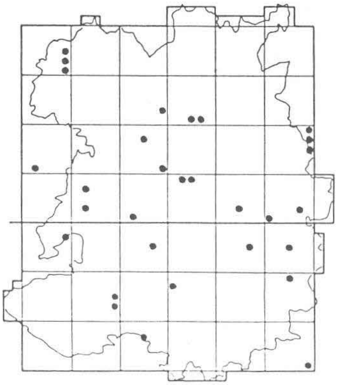
Bare patches in dry herb-rich grassland, often on disturbed ground near rabbit warrens, or in stony places and disused sand pits on dry shallow sandy or loamy soils, PN poor to med, base med to rich, mod acid to calc, exposed, sunny and warm. Characteristic of annual communities of disturbed or open sites, a poor competitor. Ass: *Ornit per, Hiera pil, Teesd nud, Jasio mon, Aira pra, Saxif tri, Aphan arv, Eroph ver, Sedum acr.*
Locally frequent throughout lowlands: v. rare in hills.

WOOD-SORREL FAMILY
OXALIDACEAE

Wood-sorrel
'Cuckoo's sour', 'Cuckoo's bread & cheese', 'Cuckoo's meat'
Oxalis acetosella L.

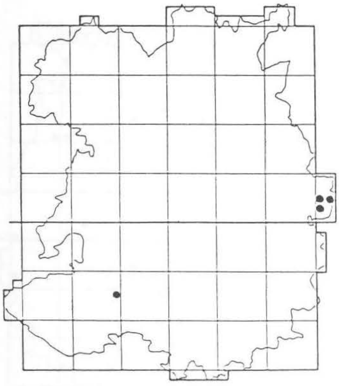
Woods, scrub, hedgebanks, edges of screes, shaded grassland and flushes on moist to dry humus rich soils, PN poor, base poor to rich, acid to calc, shaded, sheltered, humid, tolerant of grazing but not of bright sunlight nor of compet with more vigorous plants. Ass: *Anemo nem, Viola riv, Primu vul, Desch fle, Galiu sax, Vacci myr, Ajuga rep.*
Characteristic of the N facing valley-sides on the Long Mynd (see Packham 1979). Locally frequent in upland: sparse in lowland.

Procumbent yellow-sorrel
***Oxalis corniculata** L.



Well established weed in gardens on a variety of soils; persistent and difficult to eradicate.
Scattered but sparse through W and Centre of region. First records (undated, c1800) in *LFS* at Welsh Bridge, Shrewsbury; Oakly Park, Ludlow.

Upright yellow-sorrel
***Oxalis europaea** Jord.
(*O. stricta* auct.)

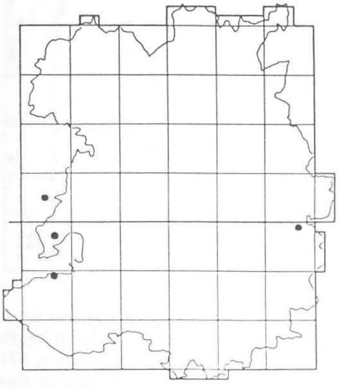


A garden escape naturalised on roadside verges, hedgebanks and paths. Albrighton area and near Hopesay.

***Oxalis articulata** Savigny
On rubbish in a disused quarry in Chetwynd area (1976 BRF).

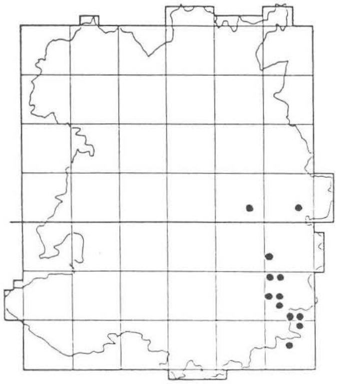
BALSAM FAMILY
BALSAMINACEAE

Touch-me-not balsam, Yellow balsam
Impatiens noli-tangere L.



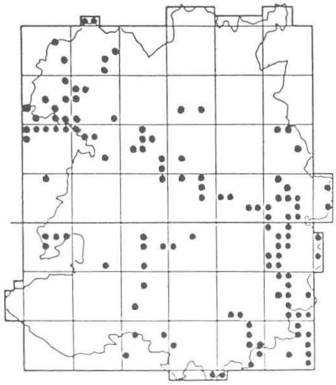
Shady riverbanks and damp woodland on moist to damp clay, loam or mud, PN rich, base med to rich, mod acid to neut, ½ shade to shade, sheltered, intolerant of grazing. Ass: *Symph × upl, Urtic dio, Alliu urs, Myoso sco, Phala aru, Scrop aur.*
Rare: probably native in Marrington Dingle where it has been known since the beginning of the 17th century (see chapter 2), and possibly on the R Unk near Mainstone. No doubt introduced in Badger Dingle and at Leighton near Welshpool.

Small balsam
***Impatiens parviflora** DC.



Riverbanks, marshy ground in woodlands, on rubbish tips and beside paths, on moist to damp clay or alluvium, PN med to rich, base med to rich, mod acid to neut, shady, sheltered.
Locally frequent and naturalised in suitable places along the Lower Severn and its tributaries in the SE of region.

Indian balsam, Himalayan balsam, Policeman's helmet
***Impatiens glandulifera** Royle



Extensively naturalised along rivers, streams and on disturbed ground near water, on intermittently flooded damp to wet sandy or loamy soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade, warm, sheltered. A v. vigorous and fast growing annual needing bare mud for seedling establishment but soon over-topping all but the tallest perennial herbs. Explosive dispersal mechanism spreads seed over short distances but abundance in flood zone of R Severn and tributaries suggests that water dispersal is also important. Ass: *Tanac vul, Artem vul, Rumex obt, Phala aru, Polyg hyd, Myoso sco, Mimul gut.*
Frequent to locally abundant along Severn and major tributaries. First recorded at Coedyrallt on R Dee (1910), later in Badger Dingle; spreading up R Severn to reach Preston Montford by 1959; up R Teme to Knighton by 1964.

MAPLE FAMILY
ACERACEAE

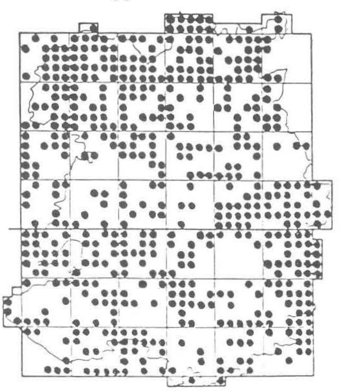
Sycamore
***Acer pseudoplatanus** L.
Woods and plantations, parks, hedges, scrub, waste ground and gardens on moist to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to shade, exposed or sheltered. Ass: *Fraxi exc, Ulmus gla, Sambu nig, Querc rob, Crata mon.*
A well established woodland weed whose high seed production helps it to take over habitats more naturally dominated by ash or wych elm. Selectively attacked by grey squirrel (who like it), and conservationists (who don't). Also extensively planted and a useful shelter belt tree near hill farms. Frequent to abundant throughout the region.

Norway maple
***Acer platanoides** L.
Fairly commonly planted in parks and hedgerows, but scarcely naturalised. Sometimes in the red-leaved form.

Field maple
Acer campestre L.
Hedges, scrub and sometimes in old broad-leaved woodland, on damp to dry clay or loam soils, PN med to rich, base med to rich, mod acid to calc, sun to shade. Ass: *Vibur opu, Coryl ave, Fraxi exc, Crata mon, Tilia cor, Malus syl.*
Undoubtedly a member of native tree flora in old species-rich woodlands on Wenlock Edge and elsewhere in S of region, but commonest as a hedgerow tree in the lowlands.

HORSE-CHESTNUT FAMILY
HIPPOCASTANACEAE

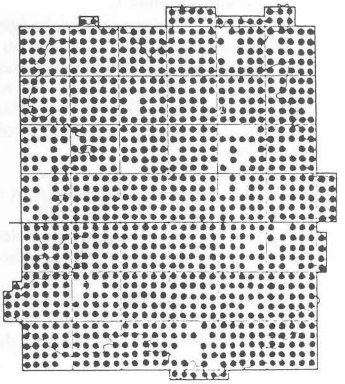
Horse-chestnut
***Aesculus hippocastanum** L.



Parks, gardens and hedges, commonly planted and reproducing freely by seed but scarcely naturalised.
Frequent throughout region except at higher altitudes.

HOLLY FAMILY
AQUIFOLIACEAE

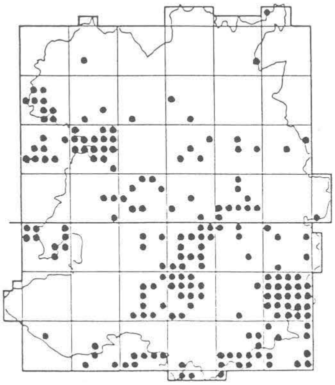
Holly
Ilex aquifolium L.



Hedges, old woodland and the sites of former woods, esp abundant in some heathy oak woods on dry to damp soils, PN med to rich, base poor to rich (but rarely on limestone), acid to neut, sun to shade. Ass: *Querc rob, Querc pet, Sorbu auc, Betul pen, Coryl ave, Crata mon, Acer cam.*
An indicator of woodland antiquity, and individual holly trees may themselves be v. long-lived. A notable group of ancient holly, well over 200yrs old, is scattered over a large area of exposed N facing hill pasture near the N end of the Stiperstones ridge at 1000–1250 ft.
The origin of this 'Holly parkland' is obscure and there is v. little sign of regeneration under the present grazing regime (see also rowan): several grazing exclosures have recently been fenced to investigate this problem.
In similar sites elsewhere (e.g. Shelve Pool) regeneration is prolific, presumably with the help of redwings, fieldfares and other fruit-eating birds.
As a hedgerow plant holly was formerly encouraged, particularly near smallholdings in parish boundary squatter settlements where its economic value must have been significant, possibly as winter fodder. The hard winter of 1981–82 devastated hollies in a large pat of the N Shropshire plain where most trees were completely defoliated and many killed.
Abundant throughout region.

SPINDLE-TREE FAMILY
CELASTRACEAE

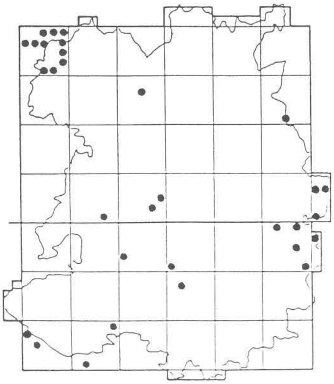
Spindle
'Catty-tree'
Euonymus europaeus L.



As single bushes in old broad-leaved woodland, in greater quantity in hedges and abandoned quarries esp on limestone or heavy clay on dry to damp soils, PN med to rich, base med to rich, neut to calc, shade to ½ shade, sheltered. Ass: *Cornu san, Acer cam, Coryl ave, Clema vit, Crata mon, Daphn lau, Frang aln.*
Commonest on limestone but not confined to it: frequent in NW, Wenlock Edge area and SE of region, sparse elsewhere and absent from most of the Clun Forest, West Central hills and NE plain.

BOX FAMILY
BUXACEAE

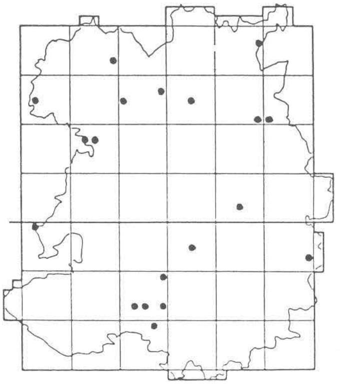
Box
***Buxus sempervirens** L.



Planted but scarcely naturalised in spinnies and small woodlands, generally for game cover. One of the few evergreen shrubs to survive the hard winter of 1981–82 apparently unscathed (see holly).
Locally frequent in NW and eastern edges of region: scattered elsewhere.

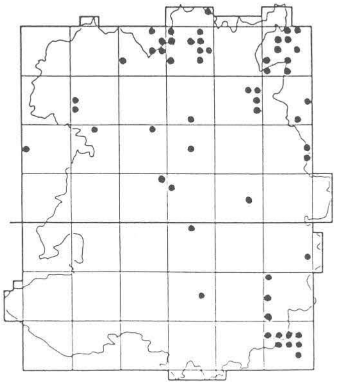
BUCKTHORN FAMILY
RHAMNACEAE

Buckthorn
Rhamnus catharticus L.



An occasional hedgerow tree on fertile usu calcareous soils in warm sites. Ass: *Crata mon, Prunu spi, Malus syl, Rubus fru, Solan dul.*
V local in Ludlow – Wenlock Edge area; rare in NW uplands and N Shropshire plain.

Alder buckthorn
Frangula alnus Miller



Scrub and open woodland usu on edges of peat mosses or damp heaths, on damp to moist peat or loam, PN poor, base med to poor, acid to mod acid, sun to ½ shade. Ass: *Alnus glu, Salix cin, Betul pub, Querc pet, Molin cae.*
Locally frequent on N Shropshire mosses; Wyre Forest; Hinstock; Cheswardine areas; rare elsewhere in lowland.

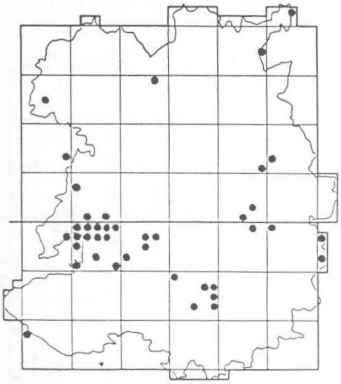
PEA FLOWER FAMILY
LEGUMINOSAE

Tree lupin
***Lupinus arboreus** Sims
Self-sown and thoroughly naturalised in abandoned parts of sand and gravel quarry near Dorrington and along adjacent roadside.

Garden lupin
***Lupinus polyphyllus** Lindley

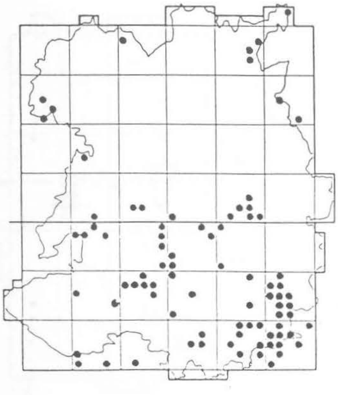
Established on railway bank by main line at Wombridge near the level crossing (1982 WAT); road bank near Hilton, Warfield (ICT); banks above M54 in SJ 61 (PHO).

Laburnum
'French broom', 'Golden chains', 'Seyny tree'
***Laburnum anagyroides** Medicus



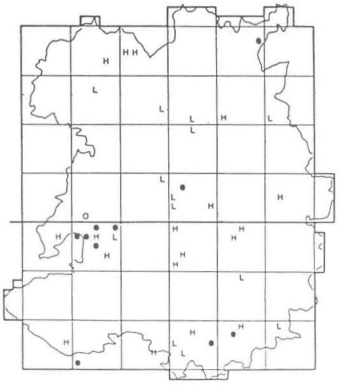
Well established in hedges esp in hill country. A remarkable concentration of laburnum is found in hedges in the old lead mining area around Shelve and Pennerley; the reason for this is not known, though presumably the plant was of some economic value to smallholders rather than being grown purely for ornament.
Scattered but locally frequent elsewhere in the region.

Dyer's greenweed
'Hallelujah'
Genista tinctoria L.



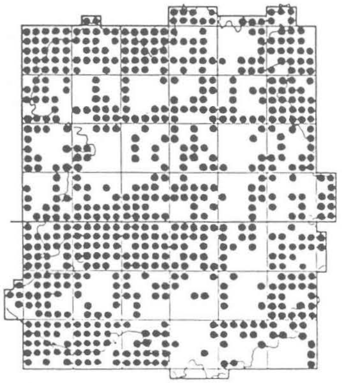
Old pastures, heath and open scrub on damp to dry soils, PN poor, base med to rich, acid to neut, sun to ½ shade, sheltered, fairly tolerant of grazing but often found in coarse turf. A typical member of species-rich old field community in the hills. Ass: *Antho odo, Succi pra, Poten ere, Hyper pul, Lathy mon, Galiu sax, Stach off.*
Locally frequent in central hills; Clee hills — Wyre Forest area; rare elsewhere and absent from Clun Forest and most of N Shropshire plain.

Petty whin, Needle furze
Genista anglica L.



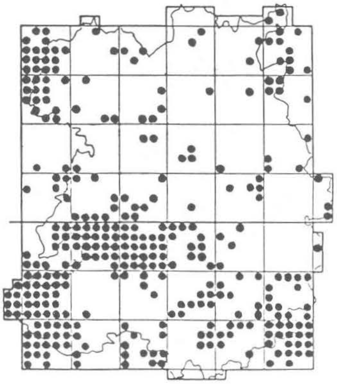
Heaths, dry peat mosses and infertile pasture on moist to dry often peaty soils, PN poor, base poor, v. acid to acid, sunny, little grazed. Ass: *Ulex gal, Molin cae, Danth dec, Callu vul, Genis tin, Succi pra, Erica tet.*
Local in Shelve – Pennerley and Catherton Common areas: now v. rare elsewhere though formerly frequent; decreasing through habitat loss.

Gorse
'Gorst', 'Goss'
Ulex europaeus L.



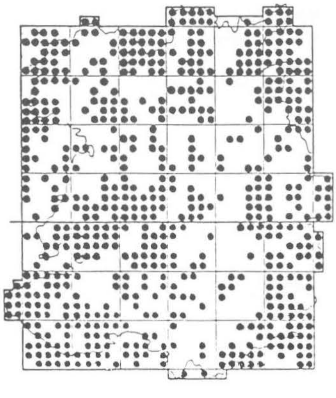
Heath and moorland, scrubby hillsides, banks, open woods on dry, sandy, stony or peaty soils, PN poor, base poor to med (rarely on limestone), acid to neut, sun to ½ shade, exposed, tolerant of heavy grazing. Ass: *Ulex gal, Cytis sco, Sorbu auc, Genis ang, Callu vul, Erica cin, Pteri aqu.*
Gorse is comparatively short-lived and was extensively killed by the hard winter of 1981–82. It regenerates vigorously from seed after fire and was formerly managed in this way for winter fodder.
In Shropshire the two species of *Ulex* are about equally common and are probably both native; further west in Wales *U. europaeus* is almost certainly introduced. Frequent to locally abundant throughout region.

Western gorse
Ulex gallii Planchon



Acid heathland, moorland and hillsides, more strictly calcifuge than *U. europaeus* and commoner in the hills. Ass: *Ulex eur, Cytis sco, Sorbu auc, Betul pen, Callu vul, Erica cin.*
On grazed heathland, such as the Stiperstones, *U. gallii* appears to be favoured by trampling and manuring, being commonest where flocks and herds gather.
Frequent to locally abundant in Central hills; Clun Forest; Clee hills; Wyre Forest; Oswestry uplands: sparse elsewhere.

Broom
'Brum'
Cytisus scoparius (L.) Link
(*Sarothamnus scoparius* (L.) Wimmer)

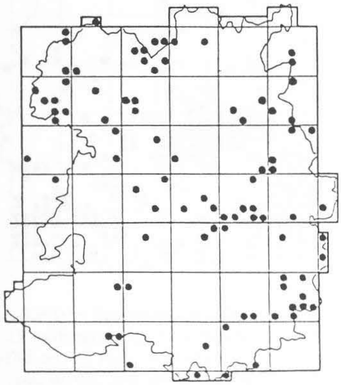


Open scrub, under-managed grassland and heathland, often on steep hillsides on dry sandy or stony soil, PN poor, base poor to med, acid to mod acid, sun to ½ shade, tolerant of light grazing but generally a poor competitor with more vigorous shrubs and birch. Ass: *Ulex eur, Ulex gal, Crata mon, Betul pen, Sorbu auc, Ilex aqu, Pteri aqu.*

An early member of pioneer scrub on abandoned pasture, disturbed ground such as railway embankments or sandy quarries. A common colonist after burning. One of the first shrubs to be cut back by hard frost.

Common in suitable habitats throughout the region.

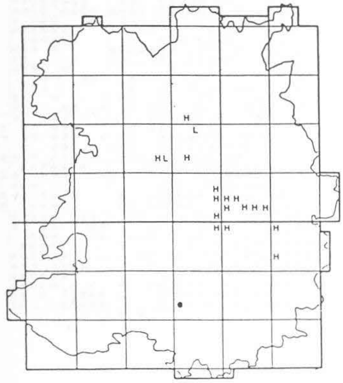
Common restharrow
Ononis repens L.



Grassy places, scrub, banks and quarries on limestone on dry and well drained shallow often stony soils, PN poor to med, base med to rich, neut to calc, sun to ½ shade, warm, exposed, tolerant of trampling and light grazing. Sometimes a pioneer species on disturbed ground on limestone rubble. Ass: *Leont his, Centa sca, Galiu ver, Polgy vul, Pimpi sax, Briza med, Antho odo.*

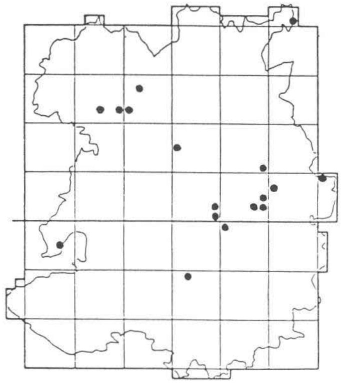
Locally frequent in Oswestry uplands and Much Wenlock area: scattered elsewhere in lowlands: rare in hill country off the limestone.

Spiny restharrow
Ononis spinosa L.



Roadside bank at edge of field at Lydehole near Culmington (1978 MSF); riverside pasture on W bank of R Severn 0.5 km downstream from Preston Boats (1984 V A Banbury, det Helen Matthews). Formerly much commoner in Shropshire: decreasing.

Lucerne
***Medicago sativa** L.



Occasionally persisting as a relic of cultivation on the edges of fields and roadside verges. Not now commonly grown as a crop.

Sparse in N Shropshire plain.

Black medick
Medicago lupulina L.

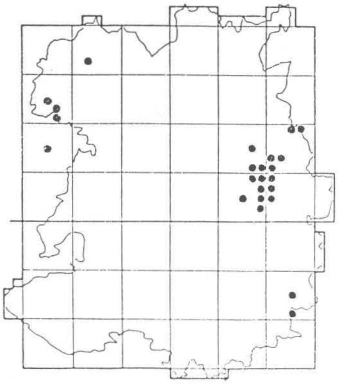
Grassland, roadside verges, waste ground, rubbish tips and quarries on damp to dry soils, PN med, base med to rich, mod acid to calc, sunny, warm, tolerant of grazing and trampling but not v. persistent in old grassland. Ass: *Trifo pra, Cynos cri, Cirsi arv, Veron ser, Ranun rep, Plant lan.*

Frequent to abundant in suitable habitats throughout region.

Spotted medick
Medicago arabica (L.) Hudson

Only 2 recent records: from Shrewsbury (1970–73); a lane near Bayton (1977) (v c 37).

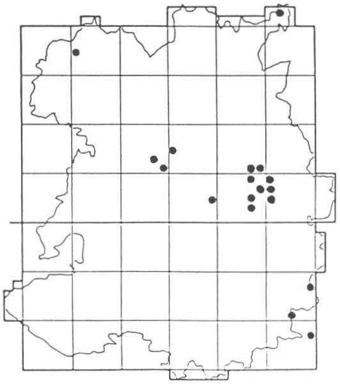
Tall melilot
***Melilotus altissima** Thuill.



Waste ground, building sites, old railway sidings, quarries and other disturbed areas, on dry soils, PN med to rich, base med to rich, mod acid to calc, sunny. Ass: *Tripl ino, Matri rec, Matri mat, Senec vis, Papav dub, Armor rus.*

Locally abundant in Telford and Newport area: frequent near Llanymynech; rare elsewhere.

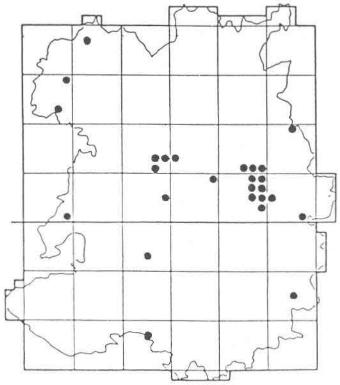
Ribbed melilot
***Melilotus officinalis** (L.) Pallas



Waste ground, disturbed roadside verges, building sites, rubbish tips and edges of fields on damp to dry soils, PN med, base med to rich, mod acid to calc, sunny. A pioneer weed of disturbed land not persisting long. Ass: *Chame ang, Epilo cil, Resed lola, Senec squ, Vulpi myu.*

Locally frequent in Shrewsbury and Telford areas: sparse elsewhere in lowland.

White melilot
***Melilotus alba** Medicus

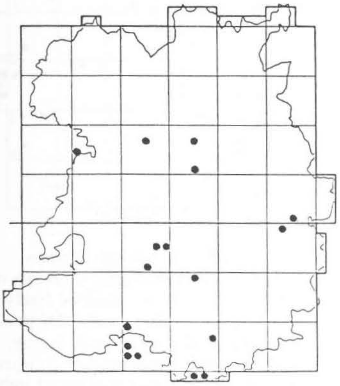


Waste ground, building sites, railway sidings, sand quarries, rubbish tips and other disturbed or bare areas, on dry sandy or stony soils, also on cinders and ballast, PN med to rich,

base med to rich, mod acid to calc, sunny, warm. Ass: *Medic lup, Epilo cil, Holcu lan, Arrhe ela, Chame ang, Vulpi myu.*
Locally frequent to abundant in Shrewsbury and Telford (eg by M54). Rather more sparse in region than ribbed melilot.

Small melilot
Melilotus indica (L.) All.
Casual; Rindleford (1957 *TCSVFC*); in *ABF* for SJ 32; and in v c 47 at Llansantffraid (1943 J A Webb).

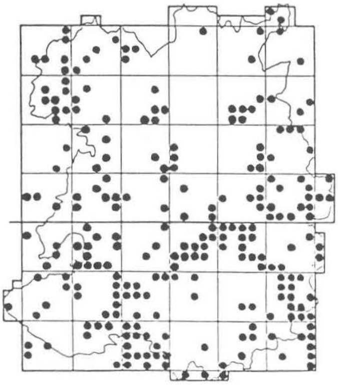
Slender trefoil
Trifolium micranthum Viv.



Sandy lawns, short turf, footpaths and bare patches in grassland on dry sandy soils, PN med, base med to rich, mod acid to neut, sunny, tolerant of heavy trampling, mowing or grazing but not of compet with taller plants. Ass: *Scler ann, Lepid het, Ornit per, Sperg rub, Trifo dub.*
Sparse but probably under-recorded (easily overlooked): around Shrewsbury; Church Stretton area; Ludlow and Bridgnorth districts.

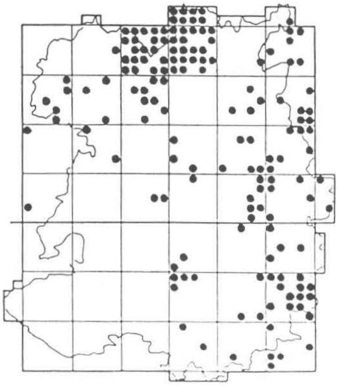
Lesser trefoil
Trifolium dubium Sibth.
Grassland, roadside verges, lawns, waste ground, quarries on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, tolerant of grazing, mowing and trampling, among the commonest lawn weeds on moderately fertile soils, Ass: *Trifo rep, Festu rub, Plant lan, Veron ser, Hypoc rad, Belli per.*
Common in suitable habitats throughout region except at highest altitudes.

Hop trefoil
Trifolium campestre Schreber
Bare patches in grassland and other disturbed habitats, railway sidings, quarries on dry sandy or stony soils, including ballast and cinders, PN med, base med to rich, mod acid to calc, sunny exposed. A pioneer plant tolerant of trampling and light grazing. Ass:



Medic lup, Holcu lan, Hyper per, Trifo dub, Linum cat, Hiera pil, Trise fla, Centa ery.
Frequent on Wenlock Edge; Ludlow hills; Oswestry uplands; Lower Severn Valley: sparse to locally frequent off the limestone.

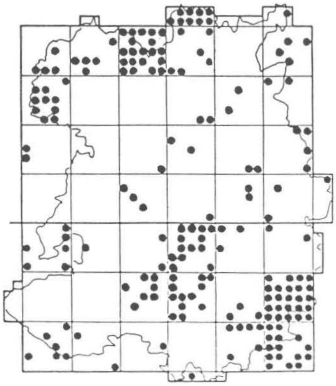
Alsike clover
***Trifolium hybridum** L.



A fodder plant and a constituent of some amenity grass-seed mixtures well established and naturalised on roadsides and field edges and disturbed ground on dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Ass: *Arena ser, Artem vul, Chrys vul, Hyper per, Linar vul, Galiu mol.*
Frequent in Lower Severn Valley; Ellesmere – Whitchurch area; and around Church Stretton: locally frequent to sparse elsewhere in lowlands.

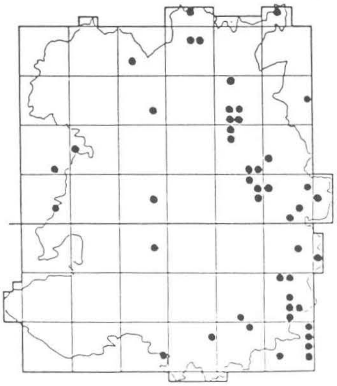
White clover
Trifolium repens L.
Grasslands, roadside verges, lawns, edges of fields and disturbed ground on moist to dry soils, PN med to rich, base poor to rich, acid to calc, sun to ½ shade, v. tolerant of grazing, mowing and trampling but a poor competitor with taller grasses. An important component is seed mixtures for grazing, but also a member of wild grassland communities. Ass: *Loliu per, Trifo pra, Cynos cri, Festu rub, Belli per, Hypoc rad, Plant lan, Veron ser, Achil mil.*
Abundant throughout region.

Zigzag clover
Trifolium medium L.



Borders of scrub and grassland, grassy banks and short-herb communities by paths often on limestone, on dry sometimes shallow stony soils, PN poor to med, base med to rich, mod acid to calc, warm, sunny. A typical member of the transitional community of med-sized perennial herbs between the grass and scrub stages of succession. Ass: *Origa vul, Hyper hir, Fraga ves, Galiu ver, Clino vul, Pimpi sax, Viola hir.*
Locally frequent in Oswestry upland; Ellesmere – Whitchurch area; Wenlock Edge; and extreme SE of region; sparse elsewhere.

Hare's-foot clover
Trifolium arvense L.

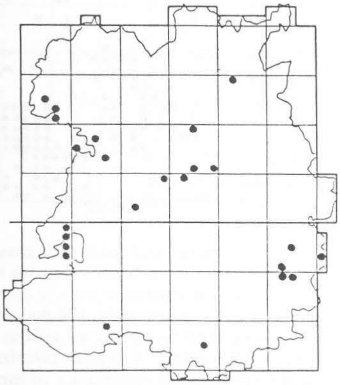


Open patches in short grassland and bare stony or sandy places such as quarry floors on non-calcareous rocks on dry soils, PN poor, base med, acid to neut, sunny, warm and sheltered. A poor competitor often in pioneer communities. Ass: *Hyper per, Trifo dub, Vicia hir, Poten rep, Medic lup.* Locally frequent in E of region; rare elsewhere.

Rough clover
$Trifolium scabrum L.

Not in v c 40 (?).
One recent record in Monts (v c 47) on a roadside verge near canal-river aqueduct over R Vyrnwy (1978 EDP). Formerly recorded from Crose Mere; Welsh Frankton (1920 *RBF*); and from Cound Arbour sand quarry (1957 *TCSVFC*).

Knotted clover
Trifolium striatum L.



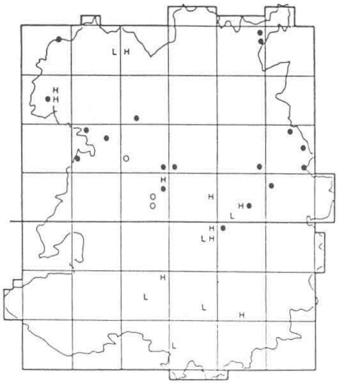
Bare patches in open short grassland and waste ground on shallow sandy or stony soils, often on S facing slopes on dry soils, PN poor to med, base med, mod acid to neut, open, sunny, warm. Ass: *Erodi cic, Geran mol, Myoso ram, Rumex alla, Aphan arv, Valer loc, Veron arv.*
Sparse on edges of upland from Oswestry to Shrewsbury; near Bridgnorth: rare elsewhere.

Red clover
Trifolium pratense L.

Sometimes sown as a crop but also a common member of grassland communities on moist to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny typical of hay meadows and verges but tolerant of fairly heavy grazing. Ass: *Alope pra, Phleu pra, Festu pra, Lathy pra, Achil mil, Ranun acr, Trifo rep.*
Frequent to abundant throughout region.

Kidney vetch
Anthyllis vulneraria L.

Open grassland, roadside verges, sandy paths and railway sidings on shallow dry sandy or stony soils including cinders or ballast, PN poor, base med to rich, mod acid to calc, sunny, warm, tolerant of grazing and trampling. Often associated with limestone but not restricted to it. Ass: *Erodi cic, Vulpi bro, Anchu arv, Cardu nut, Geran mol.*



Sparse between Oswestry and Shrewsbury, particularly in sand pits of Dorrington – Condover area: isolated localities in E of lowlands.
Formerly recorded from many localities in S Shropshire: decreasing.

Common bird's-foot-trefoil
'Cuckoo's stockings', 'Chicken's foot' 'Sparrow's foot', 'Alleluia', 'Tom Thumb'
Lotus corniculatus L.

Grassland, heath, open scrub, roadside verges and waste ground on damp to dry soils, PN poor to med, base poor to rich, acid to calc, sun to ½ shade, tolerant of grazing and of compet in short turf. Indifferent to acidity or lime content. Ass: *Festu ovi, Antho odo, Agros cap, Viola riv, Veron cha, Poten ere, Plant lan, Luzul cam.*
Frequent to abundant in suitable habitats, esp old pastures, throughout region. The common blue butterfly is often associated with it.

Narrow-leaved bird's-foot-trefoil
Lotus tenuis Waldst. & Kit. ex Willd.

Recorded in the 1960s from Kinsley Wood, Knighton by GPR, but not recently confirmed. An earlier record from Welsh Frankton *RBF* 1920.

Large bird's-foot trefoil
Lotus uliginosus Schkuhr

Damp meadows, wet hollows in pasture, ditch banks and fens on wet to damp often winter-flooded clay, loam or peaty soils, PN poor to med, base poor to rich, acid to neut, sun to ½ shade, sheltered, tolerant of light grazing or mowing. A strong competitor with grasses. Ass: *Juncu acu, Holcu lan, Festu pra, Succi pra, Lychn flo Galiu pal.*
Frequent in suitable habitats throughout region.

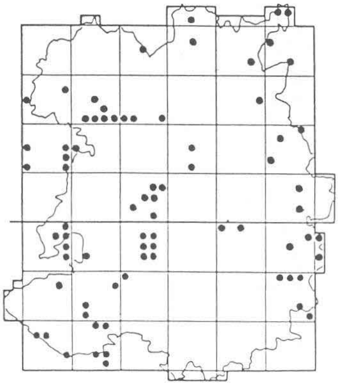
Wild liquorice, Milk vetch
Astragalus glycyphyllos L.

Edges of open woodland, coarse grass and waste places on dry to damp soils, PN med to rich, base med, mod acid, sun to ½ shade, warm, sheltered. Ass: *Brach syl, Desma rig, Poa nem, Arcti min, Ceras sem, Galiu apa, Heder hel, Moehr tri, Thymu pra.*
V. rare: Bridgnorth; Stanwardine.

Acacia
***Robinia pseudacacia** L.

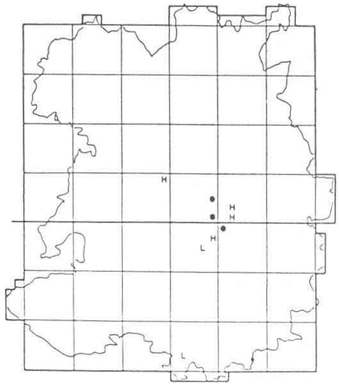
Commonly grown in parks and gardens and self-propagated by seed and broken twigs but scarcely naturalised. Lowlands; unevenly recorded.

Bird's-foot
Ornithopus perpusillus L.



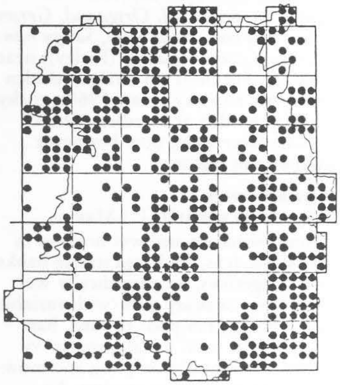
Bare or disturbed patches in open grassland, roadside verges, sand pits or rocky hillsides on dry shallow freely drained sandy or stony soils, PN poor, base poor, mod acid to acid, sunny, warm, exposed. Intolerant of compet with taller grasses but will stand light grazing. A member of the distinct winter-annual community but flowering later than most. Ass: *Tarax lae, Erodi cic, Aira pra, Festu ovi, Galiu ver, Aphan arv, Hiera pil, Myoso dis, Lycop arv, Rumex alla, Teesd nud.*
Locally frequent in Knockin to Baschurch area; Breidden hills; Dorrington to Church Stretton; Bridgnorth area: scattered records elsewhere.

Sainfoin
***Onobrychis viciifolia** Scop.



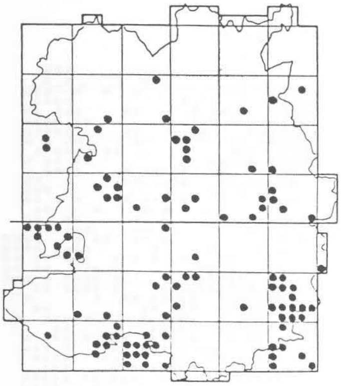
Formerly cultivated as a fodder crop. Still persisting in a few places on limestone soils in the Much Wenlock area.

Hairy tare
Vicia hirsuta (L.) S. F. Gray



Waste and disturbed ground, grassy places and roadside verges on dry often stony but sometimes winter-wet soils, PN med to rich, base med to rich, mod acid to calc, sunny. A scrambling plant of tall grass or herb communities where the vegetation is periodically disturbed. Ass: *Equis arv, Holcu lan, Hyper per, Medic lup, Linar vul, Epilo cil, Trifo cam, Tussi far.*
Frequent to locally abundant throughout region.

Smooth tare
Vicia tetrasperma (L.) Schreber



Roadside verges, hedgebanks and waste ground on dry to damp sometimes winter-wet clay or loamy soils, PN med to rich, base med, mod acid to neut, sun to ½ shade. A scrambling plant among coarse grassy vegetation. Ass: *Arrhe ela, Malva mos, Centa nig, Lathy pra, Herac sph, Vicia hir, Galiu apa.*
Locally frequent in most parts, but apparently absent from extreme N of region.

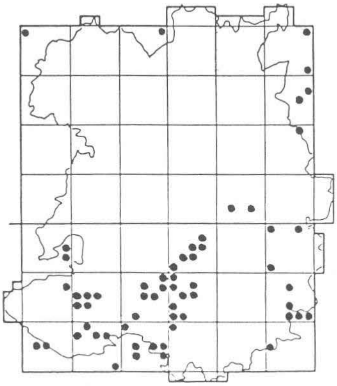
Tufted vetch
Vicia cracca L.

Hedgebanks, stream banks, fens, marshes, open scrub, pond and ditch sides on moist to damp often winter-wet clay, loam or peaty soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, sheltered, warm. Scrambling among coarse grasses and other tall herbaceous vegetation. Ass: *Herac sph, Centa nig, Arrhe ela, Lathy pra, Achil pta, Filip ulm, Holcu lan.*
Frequent in suitable habitats throughout region.

Wood bitter-vetch
$Vicia orobus DC.

Not in v c 40.
Short stony pasture among hawthorns near railway line at Llangunllo, v c 43. A few scattered plants found 1978 by JR. Recorded in *ABF* for SO 77 and by J A Webb in 1940 from Hyssington and near Forden (MS *Flora of Monts*).

Wood vetch
Vicia sylvatica L.



Edges and rides in woodland and scrub, steep roadside banks and hedgerows on dry to damp soils, PN med, base med to rich, neut to calc, associated with limestone but not confined to it, ½ shade, sheltered. Typically scrambling over bushes or tall herbaceous vegetation. Ass: *Trifo med, Tamus com, Arum mac, Bromu ram.*
Frequent to locally abundant along Wenlock Edge; Corve Dale; Ludlow and Bishops Castle areas; and in the Lower Severn Valley: sparse from Ironbridge to Bridgnorth: v. rare in N and NW of region.

Bush vetch
Vicia sepium L.

Verges and hedgebanks, tall grassland, open scrub and woodland edges on damp to dry soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, sheltered, tolerant of annual mowing and compet with tall grasses. Ass: *Arrhe ela, Anthr syl, Galiu apa, Arum mac, Alope pra, Allia pet.*
Frequent to abundant throughout region.

Common vetch
Vicia sativa L.

Edges of woodland and scrub, hedgebanks and rough grassy slopes, also on bare stony ground, wasteland and the edges of cultivated fields on dry to damp soils, PN poor to rich, base med, mod acid to neut, sun to ½ shade. Most records in the region appear to be for ssp. **nigra** (L.) Ehrh. (*V. angustifolia* L.); ssp. **sativa** is no longer commonly cultivated. Ass: *Allia pet, Galiu apa, Vicia sep, Anchu arv, Vulpi bro.*
Frequent in suitable habitats throughout region: rare at higher altitudes and on N part of plain.

Spring vetch
Vicia lathyroides L.

Dry grassy slopes and sandy quarry floors, on shallow dry soils, PN poor, base med, acid to neut, sunny, warm, tolerant of rabbit grazing. Ass: *Ornit per, Sperg rub, Erodi cic, Geran mol, Myoso dis, Tarax lae.*
Very rare: Rudge (1978 BRF); Twitchen (M Williams 1980).
Reported from Ryton near Shifnal in *TCSVFC* 1960.

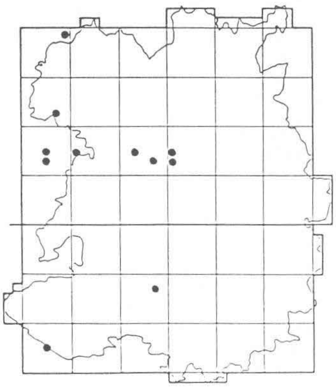
Yellow vetchling
***Lathyrus aphaca** L.

Casual. Among grass near bushes at edge of quarry, Poles Coppice, Pontesbury (1980 KED); Pant (1963) (*TCSVFC* 1963).

Meadow vetchling
Lathyrus pratensis L.

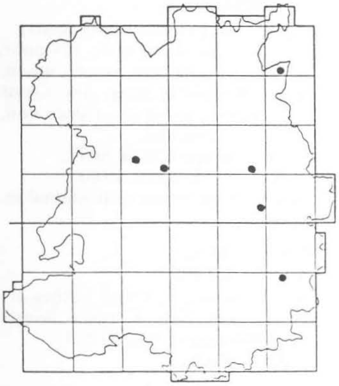
Meadows, roadside verges and hedgebanks, open scrub, fens on moist to dry sometimes winter-wet soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered. Tolerant of occasional mowing or light grazing. A typical member of the tall herb transitional community between grassland and scrub. Ass: *Arrhe ela, Herac sph, Anthr syl, Angel syl, Vicia sep, Cynos cri, Ranun acr.*
Frequent to locally abundant throughout region except at highest altitudes.

Narrow-leaved everlasting-pea
Lathyrus sylvestris L.



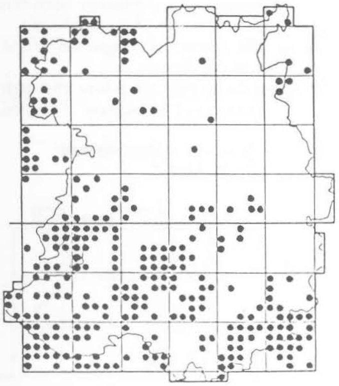
Scrubby vegetation esp on riverbanks and canal sides, marshy ground, railway embankments and overgrown hedgerows on moist to dry soils, sometimes liable to flooding, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered. A vigorous scrambling plant covering low bushes, tall herbaceous vegetation and steep earthy banks and persisting for many years. Ass: *Calys sep, Rubus fru, Sambu nig, Tanac vul, Artem vul.*
Locally frequent in Llanymynech and Shrewsbury areas: individual records at Knucklas; Westhope; and Chirk.

Broad-leaved everlasting-pea
***Lathyrus latifolius** L.



Escaped and well established on roadsides and railway banks at several localities in central and E lowlands.

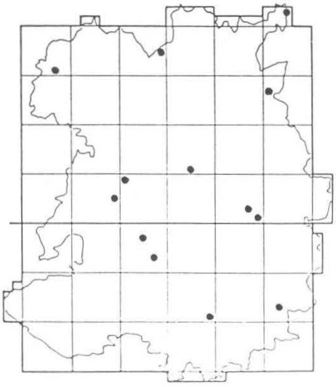
Bitter-vetch
'Posy pea'
Lathyrus montanus Bernh.



Open woods (esp oak), roadside banks and rough hill grassland on dry to damp stony or loamy humus rich soils, PN poor, base med to poor, acid to mod acid, sun to ½ shade, tolerant of light grazing. A poor competitor with taller vegetation often growing in gaps between more vigorous plants. Ass: *Solid vir, Stach off, Poten ere, Luzul pil, Veron off, Hyper pul, Galiu sax, Desch fle, Digit pur, Viola riv.*
Frequent to locally abundant throughout uplands: sparse to v. locally frequent in N Shropshire plain: tending to avoid limestone areas.

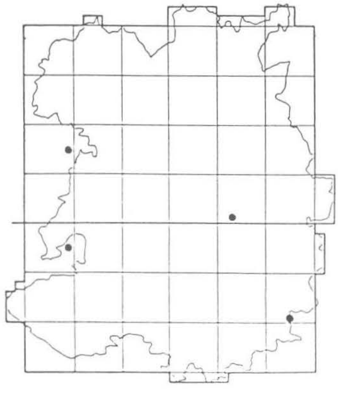
ROSE FAMILY
ROSACEAE

Bridewort
***Spiraea salicifolia** L.



Originally planted but spreading and well naturalised along ditches, pond margins, damp scrub and hedges on wet to damp soils, PN poor to med, base poor to med, acid to mod acid, sun to ½ shade. Ass: *Salix cin, Salix aur, Alnus glu, Betul pub.*
Sparse but scattered throughout region: by no means as common as it is in mid-Wales and S Snowdonia. Increasing? Reported in *RBF* 1918 as having been planted by Mr GR Jebb in a hedge by the canal towpath on Whixall Moss: still there in the 1980s.

Dropwort
Filipendula vulgaris Moench

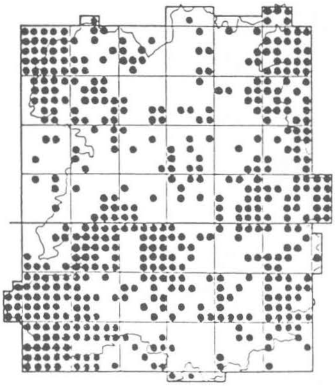


Grassland, open scrub and disused quarries on limestone and basic igneous rocks on dry shallow stony soils, PN poor, base rich, neut to calc, sunny, exposed. A rare but characteristic member of the dry tall herb community in such habitats. Ass: *Genis tin, Scabi col, Origa vul, Geran san, Inula con, Helia num, Sangu min.*
V. rare: Gleedon quarry (Farley); near Highley. Formerly on Craig Breidden but quarried away in late 1960s; rocky bank in garden at Hurdley (Church Stoke). Decreasing now but never common in region.

Meadowsweet
Filipendula ulmaria (L.) Maxim.
Damp meadows and wet hollows in grassland, fens, ditch and stream banks and hedgerows, on periodically wet clay, loam or peaty soils (with variable water-table), PN poor to med, base med to rich, acid to calc, sun to ½ shade, tolerant of trampling and mowing but not of heavy grazing. An indicator of soils with mobile groundwater. Ass: *Juncu acu, Desch cae, Angel syl, Calth pal, Phala aru, Carex amis, Eupat can, Galiu pal.*
Frequent in suitable habitats throughout region.

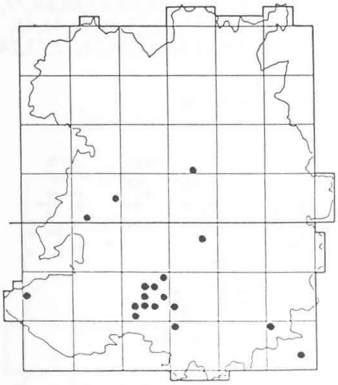
Stone bramble
†Rubus saxatilis L.
Perhaps extinct.
Formerly recorded from Craig Sychtyn (1866); Trefonen; near Bishop's Castle; Stiperstones; Wyre Forest. A recent tentative record from a wood at Nant Mawr quarry (1970 IRB) has not been confirmed.

Raspberry
Rubus idaeus L.



Woodland clearings, rides and edges, open scrub and stable screes, sometimes naturalised on disturbed ground near habitations, probably bird-sown, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Spreads by suckers to form extensive stands. Ass: *Rubus fru, Chame ang, Digit pur, Prunu spi, Sambu nig.*
Locally abundant in W Central hill country: locally frequent elsewhere in region.

Dewberry
Rubus caesius L.



Open scrub, roadside verges, rocky banks and quarries mostly on limestone on shallow stony dry soils, PN poor to med, base med to rich, neut to calc, sun to ½ shade. Ass: *Cornu san, Hyper hir, Clino vul, Crata mon, Brach syl.*

Locally frequent in Craven Arms-Wenlock Edge area: rare but probably under-recorded elsewhere in hill country.

Bramble, Blackberry
Rubus fruticosus L. agg

It is impossible to generalise about the ecology of the aggregate species. Although the microspecies were not officially included in the present survey, they have been well studied in the region by Mr E S Edees and Mr A Newton. Mr Newton kindly supplied the notes and list which follow.

'This list of Shropshire *Rubi* has been compiled systematically over several years, mostly from field visits made by myself and E S Edees but also with a few observations of the late B A Miles; these form the vast majority of the post-1950 records. The remainder are mostly determinations by myself and Miles of exsiccata in the following herbaria:

BM, K, CGE, OXF, MANCH, LIV, NMW.

Material of the following collectors has been seen:

C Bailey (Church Stretton; Ludlow)
R de G Benson (Pulverbatch; Westcott)
W A Leighton (Shrewsbury and environs; Haughmond; Shawbury; Alkmond Park)
A Ley (Wenlock Edge; Wyre Forest; Cleobury Mortimer)
W H Painter (Shifnal; Tong; Benthall; Wellington; Ercall)
A H Wolley-Dod (Woore; Whixall; Whitchurch; Pulverbatch)

This combined information provides a reasonable – if necessarily incomplete – view of the incidence of the various *Rubus* microspecies in the county. 'Unfortunately the Shrewsbury herbarium referred to in the literature has been only minimally consulted owing to the reluctance of the curator to entrust it the postal service, and the basis of W M Rogers' *Rubi* notes referred to by Lloyd & Rutter (p.30) has been reconstructed from Rogers' own record book: it has therefore been possible to decide on a consistent contemporary treatment for the names in *LRH*.

'The greatest diversity of brambles is not to be found on exposed moorland, limestone, alluvial and clay soils or dry S-facing sandstone slopes, all of which are well represented in Shropshire. In general the western portion (W of grid line 30) is the least rewarding and hospitable to brambles – Oswestry Old Racecourse is an exception – while N of the R Severn the best ground lies around former heaths and moorlands in the glacial outwash plain. Here, in spite of increasingly intensive agriculture, many brambles survive in hedges, banks and patches of woodland. Among the most productive areas are Hodnet, Prees, Shawbury and Weston Heaths, Wem and Whixall Mosses, Merrington Green and Almond (Alkmond) Park, while most of the species seen by E F Linton at Vales Wood, Ruyton, are still visible in spite of the destruction of half the 1893 wood.

'S of the Wrekin the most productive habitats are in general woodland fringes on hilly slopes, eg Farley Dingle, parts of Wenlock Edge, Oaks Wood (Habberley), Burf Castle (Quatford); Haughmond Hill can be regarded as an outpost of this S Shropshire facies.

'Many of the species typical of the southern and Midland *Rubus* flora are at their northern limits along the R Severn eg *R. pascuorum, R. bercheriensis, R. diversus, R. armipotens* and *R. rudis,* while the Wyre Forest has species confined in Shropshire to that district eg *R. condensatus, R. informifolius* and *R. pampinosus.* Offa's Dyke has not prevented outliers of predominantly Welsh and Welsh Marches species being well represented eg *R. bartonii, R. fuscicortex, R. incurvatus, R. leyanus, R. longithyrsiger* and *R. silurum. R. ludensis,* the type locality of which is Whitcliff, Ludlow, is there at the northern extremity of its range, being centred on the upper R Wye.

'A further four species have their type localities in the county. *R. rogersii* E F Linton (Vales Wood, Ruyton) was unfortunately later found to be a synonym of *R. fissus* Lindley and is now apparently extinct in Shropshire. *R. tuberculatus* is, however, one of the commonest and most widespread brambles of W and NW Britain. Its large white flowers, round petals, prostrate prickly (sometimes very prickly) stems and vigorous growth are to be seen along most roadsides, banks and waste ground in the county. It appears to favour damp low-lying and disturbed ground, which gives it a distinct advantage over other brambles; it is equally conspicuous in Cheshire and Staffordshire and in neighbouring mid-Wales. The type specimen at **CGE** was cut from a less vigorous bush than usual and had therefore given batologists some difficulties; after a visit to Red Hill (Shrewsbury) in 1974, however, Eric Edees and I were in no doubt that the plants still conspicuous there are conspecific with the abundant wayside plant.

'The rather tortuous history of *R. sublustris* Lees is fully discussed by Edees in *Watsonia* **10**, 334 (1975). It is frequent along the Severn Valley as far as Ironbridge but appears to be confined to this vicinity in Shropshire.

'Finally, we come to *Rubus leightonii,* which was gathered by its author in July 1836, so he tells us in his *Flora,* "in the hedge near the upper part of the field in front of the Can Office, Shrewsbury, on the LHS of the footpath leading down the field to the ferry over the river Severn." By the time the Flora was published "the bush . . . had been unfortunately cut down, and I have in vain repeatedly and anxiously searched the spot during the last two summers for its reappearance." He need not have worried. This elegantly handsome species, with its large, long-stamened pink flowers, neat digitate grey-backed leaves, the terminal leaflet on a conspicuously long stalk, is a notable asset to wood margins and hedge-banks throughout a large part of N Shropshire; it is found in W Cheshire sparingly, but is elsewhere frequent in Warwickshire and the hinterland of Bournemouth particularly. Not many batologists enjoy the luxury of naming a species after themselves, but as W A L explains "the present name was assigned to it by my friend Edwin Lees of Worcester"; by describing it in his *Flora* he hoped to "excite the attention of Botanists to the subject and thereby in some degree tend towards the final resolution of the great and important question of the limits of the species" – a topic which is still exercising his successors almost 150 years later.

In the list below, most records are given to the nearest 10km square only; brackets round the number indicate pre-1950 records not seen since; unbracketed numbers may include pre-1950 records. ! indicates specimens determined by Alan Newton where single colonies only are known. All records are for v c 40 Shropshire.'

Section SUBERECTI P.J. Muell.
R. nessensis W. Hall SJ(41), (51)
R. scissus W.C.R. Wats. SO 77, SJ22,

(32), (41),43,51,52,53,62,71,72,73,74
R. bertramii G. Braun SJ43 Wem Moss!
R. plicatus Weihe & Nees SO77, SJ(32),43,53
R. fissus Lindl. (*R. rogersii* E.F. Linton) – type, Ruyton SJ(32)
R. arrheniiformis W.C.R. Wats. SJ(32), (41)

Section CORYLIFOLII Lindl.
R. conjungens (Bab.) Rogers SJ(41), (51)
R. eboracensis W.C.R. Wats. SJ 43
R. sublustris Lees – type, Wellington SJ(61); SO48,49,(77),78,79,SJ33,(41), 50,70,71,72,73
R. nemorosus Hayne & Willd. (*R. balfourianus* Blox. ex Bab.) SJ70,71
R. warrenii Sudre SJ71 Weston Heath!
R. tuberculatus Bab. – type. Red Hill, Shrewsbury SJ40; SO37,38,39,59,67, 68,69,77,79,SJ30,31,33,41,42,43,51, 53,60,61,62,63,(70),71
R. rubriflorus Purchas SJ71 Weston Heath!

Section SYLVATICI P.J. Muell.
R. gratus Focke SJ62
R. calvatus Lees ex Blox. SO(28),(49), SJ40,(41),(42),(54), 62,(74)
R. ludensis W.C.R. Wats. – type, Whitcliff, Ludlow SO47,57
R. platyacanthus P.J. Muell. & Lefèv. SJ(40),53,62,70
R. nemoralis P.J. Muell. SO37,39,58, (67),77,79,SJ30,32,40,42,43,51,52, 53,62,63,71,(72),73,74
R. sciocharis Sudre SO79 Burf Castle, Quatford!
R. lindleianus Lees SO(49), 57,58,68, SJ30,31,32,33,40,41,42,43,51,52,53, 60,61,62,63,70,71,72,73,74
R. robii (W.C.R. Wats.) A. Newton SJ42,51,52,53,62
R. macrophyllus Weihe & Nees SJ62, 72,74
R.subinermoides Druce SJ62 Sutton Heath!
R. sneydii Edees SJ63 Sutton Heath!
R. chrysoxylon (Rogers) Rogers SJ(40)
R. amplificatus Lees SJ30,40,(41),42, 43,(50),51,52(60),61,(70)
R. pyramidalis Kaltenb. SJ32,(50),52
R. incurvatus Bab. SJ61
R. incurvatiformis Edees SJ(51)
R. pampinosus Lees (*R. favonii* W.C.R. Wats.) SO67,77
R. polyanthemus Lindeb. SO37,57,58, 67,68,69,79, SJ30,31,32,40,41,42,43, (50),51,52,53,61,62,(70),72
R. rubritinctus W.C.R. Wats. SO(67), 69, SJ30,32,40,42,51,61,(70)
R. rhombifolius Weihe ex Boenn. SJ(40),42,(52)
R. cardiophyllus P.J. Muell. & Lefèv. SO68,69,79, SJ30,32,40,43,(50),51, 52,53,61,62,71,72
R. lindebergii P.J. Muell. SO39, SJ51
R. errabundus W.C.R. Wats. SJ23 Oswestry Old Racecourse!
R. silurum (A. Ley) Druce SO37,(48), SJ23,31,73

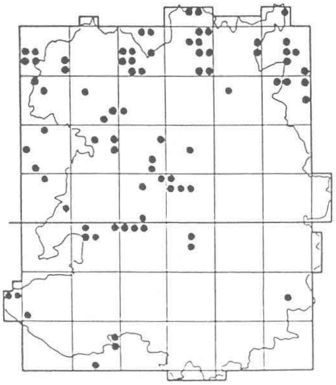
Section DISCOLORES P.J. Muell.
R. ulmifolius Schott SO47,57,58,59, 67,68,69,78,79,SJ40,(41),42,43,50, 51,52,53,54,60,(61),62,63,70,71,72
R. ulmifolius × vestitus SJ40
R. armipotens W.C. Barton ex A. Newton SO59,77,79, SJ50,60

Section SPRENGELIANI Focke
R. sprengelii Weihe SJ42,51,52, 53,60,61,62,63,72,73,74
R. lentiginosus Lees SJ42,43

Section APPENDICULATI (Genev.) Sudre
R. fuscicortex Sudre SJ(40),51
R. bartonii A. Newton SO38,79, SJ23,33,41
R. vestitus Weihe & Nees SO37, 47,(49),57,59,67,68,69,(79),SJ21,22, 30,31,33,40,41,51,52,53,60,62,63, 70,71,72
R. condensatus P.J. Muell. SO(59), 67,68,77
R. criniger (E.F. Linton) Rogers SJ(51),63
R. mucronulatus Bor. SJ51,52 Shawbury Heath!
R. wirralensis A. Newton SJ(40)
R. leyanus Rogers SO(59)
R. dentatifolius (Briggs) W.C.R. Wats. (*R. vectensis* W.C.R. Wats.) SJ40
R. infestus Weihe ex Boenn. SJ43,53
R. echinatus Lindl. SO(49),57,68,77, 79,SJ20,30,32,40,41,42,(50),51,(70)
R. echinatoides (Rogers) Dallman SJ23,30,33,74
R rudis Weihe & Nees SJ(41),(60)
R. flexuosus P.J. Muell. & Lefèv. SO(77)
R. rubristylus W.C.R. Wats. SO79, SJ32,(50),(51),53,(60),61,62,70,71,72
R adenanthoides A. Newton SO(38), SJ(40),51,(60)
R. subtercanens W.C.R. Wats. SJ60 Wrekin!
R. bloxamii Lees SJ62,72
R. informifolius Edees SO57,67,68, 77,79
R. anglofuscus Edees SO79,89, SJ72
R. euryanthemus W.C.R. Wats. SO69, SJ60,74
R. insectifolius P.J. Muell. & Lefèv. SO69, SJ50,51,52,60,61
R. longithyrsiger Lees ex Baker SO78
R. rufescens P.J. Muell. & Lefèv. SO37,77,78, SJ51,(60)
R. micans Gren. & Godr. (*R. anglosaxonicus* Gelert) SO(48)
R. raduloides (Rogers) Sudre SJ40 Earls Hill!
R. pascuorum W.C.R. Wats. SO(38), 39,(48),49,58,(59),67,68,69, SJ30,40, 51,(70)
R. leightonii Lees ex Leighton – type, Shrewsbury SJ41; SO(48),SJ31,32,42, 43,51,52,53,(54),70,(74)
R. diversus W.C.R. Wats. SO49, SJ30,40

Section GLANDULOSI P.J. Muell.
R. murrayi Sudre SO(48),59,SJ74
R. bercheriensis (Druce ex Rogers) Rogers SJ40 Oaks Wood!
R. hylocharis W.C.R. Wats. SO79, SJ30,32,40,41,42,51,52,60
R. dasyphyllus (Rogers) E.S. Marshall SO37,39,47,49,57,58,59,67,68,69,77, 78,79,SJ23,30,31,32,33,40,41,42,43, 51,52,53, 60,61,62,63,70,71,72,73,74

Marsh cinquefoil
Potentilla palustris (L.) Scop.



Shallow margins of acid pools, poor fen, damp grassy hollows in heath on mud silt or peat, PN poor, base poor to med, acid to mod acid, sun to ½ shade, sheltered. Intolerant of trampling or grazing though survives compet from taller plants. Ass: *Eleoc pal, Veron cat, Carex nig, Carex pcea, Carex ova, Carex ech, Stell als, Galiu pal, Menya tri, Molin cae.*
Locally frequent in N and NW of region: rare elsewhere.

Barren strawberry
Potentilla sterilis (L.) Garcke
Pasture, hedgebanks, open scrub and woodland edges on damp to dry soils, PN poor, base poor to rich, mod acid to calc, sun to ½ shade. Ass: *Viola riv, Fraga ves, Veron off, Poten ere, Brach syl, Prune vul, Luzul cam.*
Frequent to abundant throughout region esp in upland.

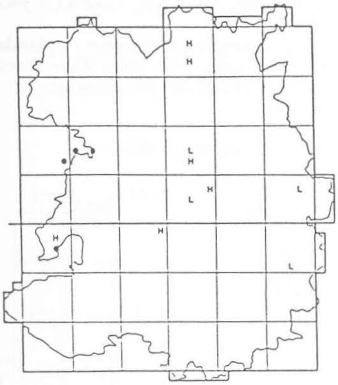
Rock cinquefoil
$Potentilla rupestris L.
Not in v c 40.
Dry stony ledges of dolerite cliffs in crevices and on shallow stony soils associated with veins of calcite. dry at surface though moist at depth through seepage in rock joints, PN poor, base med to rich, mod acid to calc, sun to ½ shade, exposed, warm in summer, ungrazed, usu solitary. A typical (in W Europe) member of the drought-tolerant tall herb community bordering scrub or open woodland on S-facing rocky slopes. Ass: *Geran san, Helia num, Scabi col, Pimpi sax, Fraga ves, Teucr sco, Erica cin, Rosa pim, Festu ovi.*
Known from Craig Breidden (v c 47) since the time of Edward Lhwyd and

John Ray: v. rare.
Though much collected by enthusiasts in the last century, this plant still survives as a few isolated individuals on inaccessible and v. dangerous cliff ledges. In the mid 1950s the wild population was apparently reduced to a single plant. Attempts to increase it by direct sowing and by planting seedlings raised from local stock have met with only moderate success.

Silverweed
Potentilla anserina L.

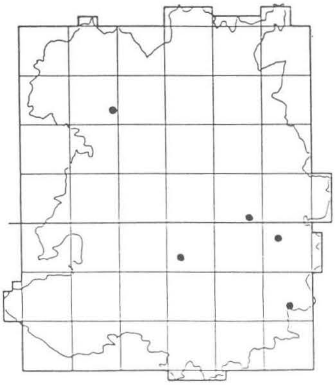
Waste ground, disturbed roadside verges (e.g. where frost grit is dumped), field gateways and edges, tracks and paths on damp to dry often winter-wet soils, PN med to rich, base med to rich, mod acid to calc, sunny, exposed. A pioneer plant of disturbed but often heavily trampled soils; salt tolerant . Ass: *Plant maj, Capse bur, Agros sto, Poa ann, Belli per.*
Frequent in suitable habitats throughout region.

Hoary cinquefoil
Potentilla argentea L.



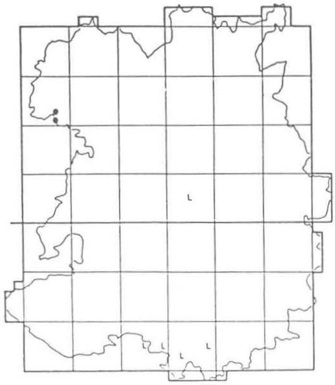
Among short grass on rock outcrops, old quarries, roadside banks, track ridges and heathy ground on dry stony soils, PN poor to med, base poor to med, acid to mod acid, sunny, warm, exposed. Ass: *Trifo str, Erodi cic, Geran luc, Geran mol, Vulpi bro, Veron arv.*
V. rare: Alberbury (only site in v c 40); in v c 47 at Crew Green; Breidden Hill; Church Stoke. Formerly recorded near Prees; Shawbury; Atcham area; Sharpstones and Bridgnorth. Decreasing through habitat loss.

Sulphur cinquefoil
***Potentilla recta** L.



Casual and sporadic on disturbed ground and roadsides at various localities in Central and E lowlands.

Spring cinquefoil
$**Potentilla tabernaemontani** Ascherson



No longer in v c 40.
Bare patches and among short turf over limestone on dry shallow stony soils, PN poor, base rich, calc, sunny, warm, exposed. Tolerant of grazing but not of compet with vigorous grasses. A typical perennial following the pioneer annual community of open limestone sites. Ass: *Erodi cic, Saxif tri, Geran rob, Aphan arv, Desma rig, Helia num, Carex car, Hiera pil.*
V. rare on the golf course on Llanymynech Hill, at one point within 2 metres of the county boundary! Formerly recorded at several places in the Ludlow area; and on the lane between Cound and Golding.

Alpine cinquefoil
$**Potentilla crantzii** (Crantz) G. Beck ex Fritsch

Recorded from Craig Breidden on the basis of a specimen in **BM** (1871 F.A. Lees).

Tormentil
Potentilla erecta (L.) Raüschel

Grassland, heathland, peaty mosses, open scrub, roadside verges on moist to damp soils, PN poor, base poor to rich, acid to neut, sun to ½ shade, tolerant of heavy grazing and of compet with all but the most vigorous grasses. Relatively indifferent to acidity. Ass: *Festu ovi, Agros cap, Luzul cam, Galiu sax, Lotus cor, Plant lan, Danth dec.*
Frequent throughout region esp in uplands.

Trailing tormentil
Potentilla anglica Laicharding

Damp grassland, verges, ditch banks, woodland edges on moist to damp peat or loamy sometimes stony soils, PN poor to med, base poor to rich, acid to neut, open, sun to ½ shade. Often occurring as a pioneer on bare patches such as recently cut ditch banks, but persisting in grazed or mown grassland. Ass: *Agros sto, Alope gen, Rumex con, Trifo arv, Leuca vul, Resed luteola, Carex hir.*
Locally frequent throughout region but v. unevenly recorded and not always distinguished from the hybrids with *P. reptans* (**P. × mixta** Nolte ex Reichb.).

Creeping cinquefoil
Potentilla reptans L.

Roadside verges, waste ground and disturbed land, edges of ploughed fields, building sites on damp to dry soils, PN med to rich, base med to rich, mod acid to calc. a pioneer plant persisting among other vigorous species. Ass: *Elymu rep, Alope pra, Cirsi arv, Plant maj, Polyg avi, Urtic dio, Rumex obt.*
Frequent throughout region.

***Potentilla rivalis** Nutt. ex Torrey & Gray

"Thoroughly established on the broadest beach-like sandy edge of NE corner of Barnsley Pool, Roughton near Bridgnorth." Found by Mrs S R Price in 1976 and determined by E J Clement. Ass: *Ranun sce, Polyg per, Polyg lap, Rumex mar, Anaga arv, Veron bec.*
This is the first British record for this annual species from riverbanks in North America; how it came to Barnsley Pool is not known. For details see *Watsonia* 13, 49 (1980).

Wild strawberry
Fragaria vesca L.

Open woodlands, scrubby grassy banks, bare patches in pasture on dry often stony soils, PN poor, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered. Tolerant of light grazing. A member of the moderately short herb-zone between grassland and scrub. Ass: *Brach syl, Primu ver, Origa*

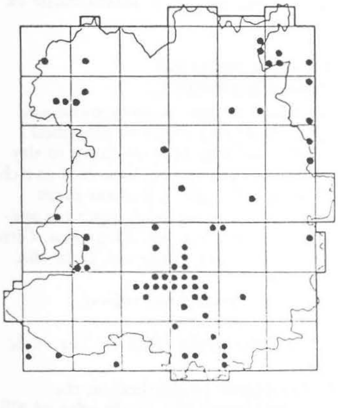
vul, Poten ste, Viola hir, Geran rob, Prune vul.
Frequent in suitable habitats throughout region.

Garden strawberry
***Fragaria ananassa** Duchesne
Established by railway track at Jackfield and Eardington (1982 WAT).

Yellow strawberry
***Duchesnea indica** (Andr.) Focke
Harmerhill (1968 *TCSVFC*).

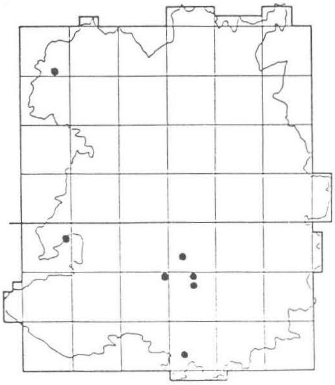
Wood avens, Herb-Bennet
Geum urbanum L.
Woodland, scrub, sheltered hedgebanks, edges of tracks and neglected corners of gardens on damp to dry often winter-wet loamy soils, PN rich, base med to rich, mod acid to calc, ½ shade to shade, sheltered. Intolerant of grazing and of compet with taller plants, though fairly persistent on marginal sites. Ass: *Geran rob, Mercu per, Circa lut, Galiu apa, Glech hed, Poa tri, Ranun rep.*
Frequent in suitable habitats throughout region.

Water avens
Geum rivale L.



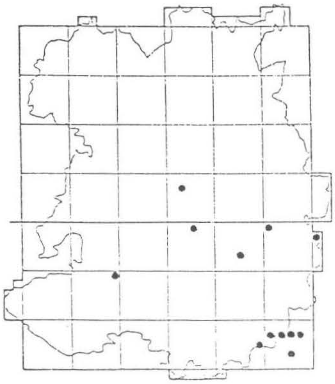
Damp meadows stream banks, verges and open rides in woodland on moist to damp soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, sheltered. Tolerant of occasional mowing or light grazing; a poor competitor in grass communities. Ass: *Filip ulm, Desch cae, Ajuga rep, Angel syl, Galiu pal, Caltha pal.*
Locally frequent in Ape Dale; Wenlock Edge; and Corve Dale area: and in extreme S of region: sparse in W, NW and NE.
Hybridises v. freely with *G. urbanum* where their habitats meet producing a hybrid swarm with 'back-crosses' to both parents (**G. × intermedium** Ehrh.)

(Map: next column)



Agrimony
Agrimonia eupatoria L.
Hedgebanks, open scrub, woodland edges and rough grassland on damp to dry soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered. Tolerant of mowing or light grazing persisting among tall grasses. Ass: *Brach syl, Arrhe ela, Alope pra, Chaer tem, Hyper per, Clino vul.*
Frequent throughout region except at highest altitudes.

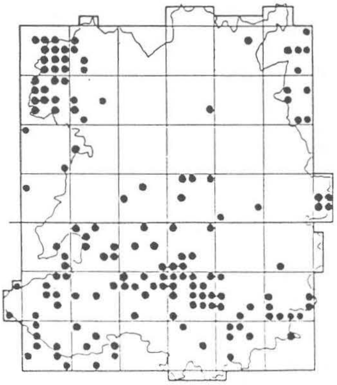
Fragrant agrimony
Agrimonia procera Wallr.
(*A. odorata* auct.)



Open woodland, scrub, grassy places, track sides on dry to damp but well drained soils, PN med, base med to rich, mod acid to neut, ½ shade, sheltered. Ass: *Arcti min, Arrhe ela, Geum urb, Herac sph, Stach off.*
Locally frequent in Wyre Forest area; sparse elsewhere in S of region.

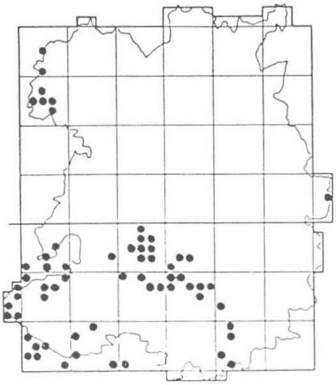
Lady's-mantle
Alchemilla vulgaris L. agg.
Old species-rich grassland, stream banks and verges on moist to damp usu well drained loam or clay soils, PN med, base med to rich, mod acid to calc, open, sunny, sheltered. Typical of damp spots in unploughed pasture and meadows.
The agg. species is locally frequent in the hill country of the W and S, but sparse in the N plain. The microspecies are briefly dealt with below.

A. filicaulis Buser ssp. **vestita** (Buser) M.E. Bradshaw



The commonest lady's-mantle in this region, particularly in grazed herb-rich pastures. Ass: *Achil mil, Rumex aosa, Ranun acr, Ajuga rep, Trise fla, Cynos cri.*
Locally frequent in Oswestry uplands; Wenlock Edge; Clee hills; Wyre Forest area; scattered records elsewhere in uplands.

A. xanthochlora Rothm.

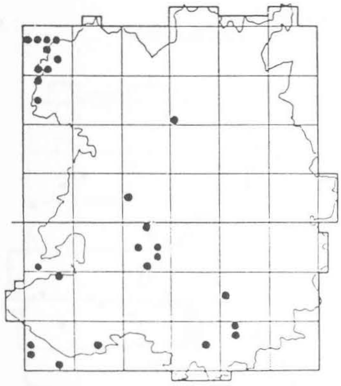


Damp verges, ditch sides, tall vegetation at field edges. Ass: *Dacty glo, Trifo arv, Ranun rep, Filip ulm, Poten rep, Prune vul, Poa tri.*
Locally frequent in Oswestry uplands; Church Stretton to Clee hills area; and parts of Clun Forest.

A. glabra Neygenf.

Similar habitats to *A. xanthochlora* but less common. V. locally frequent in Oswestry upland; Church Stretton area: scattered elsewhere in S of region: one in N plain.

(Map: next column)



Parsley-piert
Aphanes arvensis L. agg.

On bare patches or disturbed ground in permanent grassland, often on ant hills, or in cultivated fields on dry sandy soils, PN med to rich, base med to rich, mod acid to calc, sunny warm, exposed. The segregates have not been consistently distinguished for mapping. Locally frequent in W and Central hill country; and S and SE parts of lowland: sparse elsewhere.

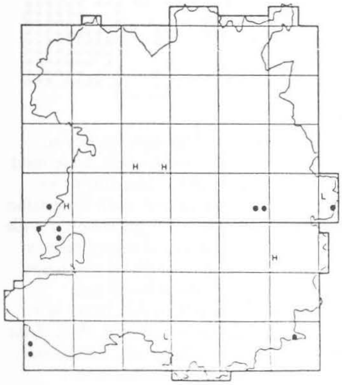
A. arvensis L.

Favours richer often calc soils. Ass: *Veron arv, Trifo rep, Thymu dru, Eroph ver, Myoso dis.*

A. microcarpa (Boiss. & Reuter) Rothm.

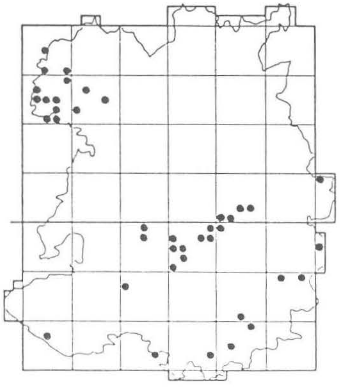
Found on poorer sandier often drier sites. Ass: *Aira pra, Rumex alla, Teesd nud, Jasio mon.*

Great burnet
Sanguisorba officinalis L.



Old species-rich meadows, ditch sides and damp banks on moist to damp often winter-wet soils, PN med to rich, base med to rich, mod acid to neut, sunny, sheltered, tolerant of annual mowing or light grazing. Competes well with tall grasses under such management. Ass: *Filip ulm, Rumex aosa, Succi pra, Ranun acr, Lathy mon.* Rather rare: Ironbridge; Coalport; Chirbury to Church Stoke; and 6 records on or outside county boundary. Formerly known at several other lowland meadow sites, but decreasing through habitat loss.

Salad burnet
Sanguisorba minor Scop.
ssp. **minor** (*Poterium sanguisorba* L.)



Grassland, scrub and quarries on dry shallow stony soils over limestone, PN poor, base med to rich, neut to calc, sunny, warm, exposed, tolerant of heavy grazing but persisting also in mod tall ungrazed turf. Its deep rootstock helps it to survive in leached superfically acid soils over limestone. Ass: *Pimpi sax, Helia num, Thymu pra, Briza med, Linum cat, Origa vul, Black per.*
Locally frequent in Oswestry upland and Wenlock Edge areas: sparse elsewhere in NW and S hill country.

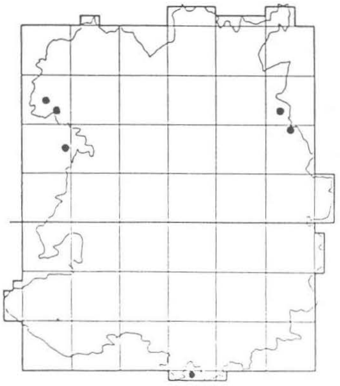
Field rose
Rosa arvensis Hudson

Scrambling over hedges and open scrub on dry well drained soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Ass: *Rubus fru, Crata mon, Prunu spi, Sambu nig, Acer cam, Cornu san, Tamus com.*
Frequent throughout lowlands, less so in upland parts of region.

Burnet rose
Rosa pimpinellifolia L.
(*R. spinosissima* L.)

Wild on ledges of limestone and dolerite cliffs on dry, shallow, stony soils, PN poor, base rich, mod acid to calc, sunny, warm, exposed. Ass: *Inula con, Helia num, Scabi col, Pimpi sax, Thymu pra, Geran san, Leuca vul, Origa vul.*
Rare: Blodwel Rock; Treflach; Craig Breidden. In two localities near Newport and at Little Hereford it is probably an escape from cultivation.

(Map: next column)



Japanese rose
***Rosa rugosa** Thunb.

Established and long persisting in abandoned cottage gardens and thrown out on rubbish tips: *R. rugosa* is commonly used as the stock for grafted standard roses.
N end of Whitchurch Heath; New Pieces (Breidden Hills): probably elsewhere.

Dog rose
Rosa canina group

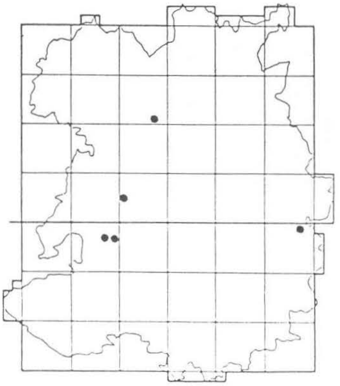
Hedges, scrub, open woodland, old pastures, quarries and waste ground, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Crata mon, Coryl ave, Prunu spi, Fraxi exc, Sambu nig.*

R. canina L. is frequent to abundant throughout the region; vars including *lutetiana* have been reported.

R. obtusifolia Desv. has been recorded from Merrington Green (1975 GGG); Betton Pool (1981 NCC); and (as var *tomentella*) from Llanymynech Hill (1962 IMV).

R. dumetorum Thuill. is known from Black Marsh and Coldyeld, both near Shelve (1975 and 1962 IMV). Habberley and Haughmond (1975 GGG).

R. caesia Sm. (incl. *R. afzeliana* Fries p.p., *R. coriifolia* Fries pp and *R.*



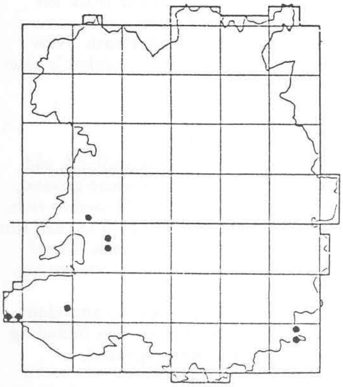
dumalis Bechst. p.p.) is recorded from Merrington; Earls Hill; Coldyeld; and Badger.

Downy rose
Rosa tomentosa group

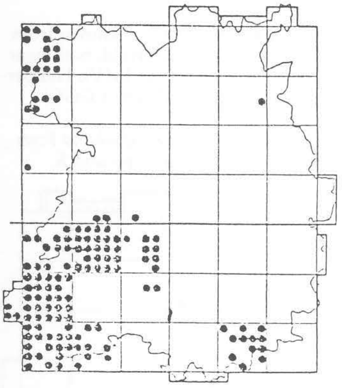
Hedges, scrub, open woodland, old pastures and brackeny slopes on damp to dry soils, PN med, mod acid to calc, sunny. Ass: *Coryl ave, Salix cap, Ilex aqu, Betul pen, Sorbu auc.*
Problems of nomenclature and species delimitation make for confusion in this group. Upland roses with downy-glaucous leaves and deep pink flowers have been treated here as *R. mollis.*

R. tomentosa Sm. has been recorded from Merrington Green (1975 GGG) and Church Stoke (1975 IMV).

R. sherardii Davies is locally frequent in the SW hills and reported from the extreme SE and NE.

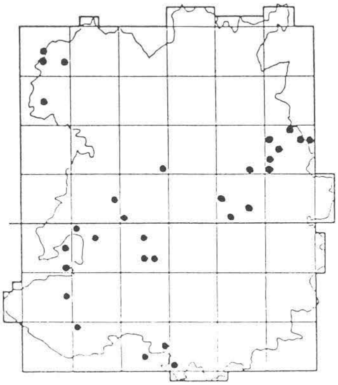


R. mollis Sm. (*R. villosa* auct.) is frequent but unevenly recorded in the hill country of the W and S.



Sweet briar
Rosa rubiginosa group

Hedges, scrub, open woodland and quarries on dry to damp soils often over limestone, PN med, base med to rich, mod acid to calc, sunny. Ass: *Crata mon, Coryl ave, Cornu san, Fraxi exc.*



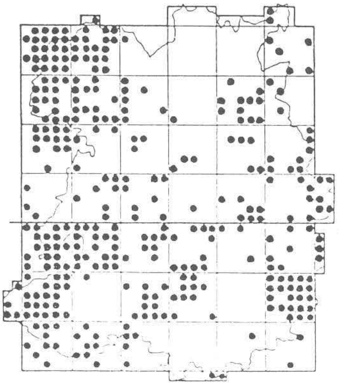
R. rubiginosa L. appears to be locally frequent (but perhaps unevenly recorded) in the Oswestry uplands; around Ludlow; and in a broad belt from Clun to Newport.

R. micrantha Borrer ex Sm. has been found on Llanymynech Rocks (EDP and IMV).

Blackthorn, Sloe
Prunus spinosa L.

Hedges, scrub, woodland margins and clearings on damp to dry soils, PN med to rich, base poor to rich, acid to calc, sun to ½ shade. Ass: *Crata mon, Coryl ave, Cornu san, Acer cam, Sambu nig, Rubus fru, Rosa arv.*
Frequent to abundant throughout region.

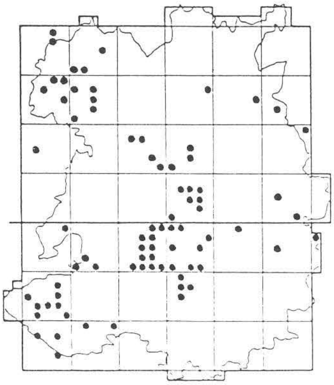
Wild plum, Damson
***Prunus domestica** L. ssp **domestica**



Hedges and old orchards esp around smallholdings in former 'squattings' on parish boundaries; decreasing now that it is no longer an economic crop. Unevenly recorded.

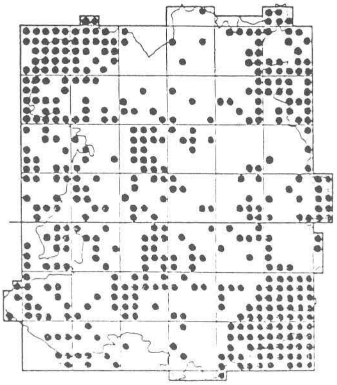
Bullace
ssp **insititia** (L.) C.K. Schneid.
Rare but under-recorded as a hedgerow shrub.

Cherry plum
***Prunus cerasifera** Ehrh.



Established v. locally in hedgrows and woodland margins. Locally frequent in the Church Stretton area; and from Shrewsbury to Oswestry: sparse elsewhere.

Wild cherry, Gean
'Merry tree'
Prunus avium (L.) L.

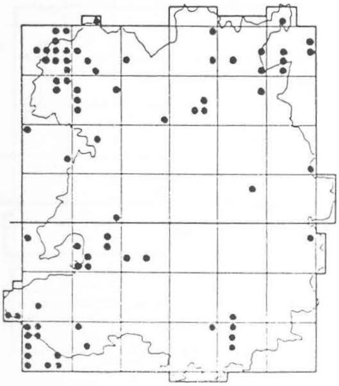


Open woods and hedges on dry to damp soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, often associated with limestone or base-rich clays, but grows on a wide range of soil types and regenerates v. freely by seed in woodland clearings. Being relatively short lived and intolerant of shade, wild cherry is v. rare in old dense woodland. Ass: *Tilia cor, Fraxi exc, Ulmus gla, Taxus bac, Fagus syl, Salix cap, Betul pen.*
Frequent to locally abundant in NW and SE of region: locally frequent to sparse elsewhere.

Sour cherry
***Prunus cerasus** L.

There are old records for Wyre Forest and scattered localities in N of region: not seen during present survey, apart from one unconfirmed and probably erroneous record near Wentnor in the 1975 Hedgerow Survey. Recorded in *ABF* for Wyre Forest area (post-1930), SJ 22 and SO 78 (pre-1930) and SO 57 (planted). *LFS* has a long description of this and the last species.

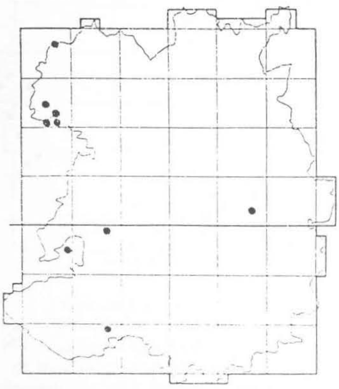
Bird cherry
Prunus padus L.



River and stream banks, damp coppices and hedges esp in the hills on moist to damp soils, PN poor to med, base med, acid to mod acid, sunny, sheltered, intolerant of strong winds. Tends to occur as solitary individuals sometimes dramatically defoliated by an ermine moth caterpillar. Ass: *Alnus glu, Salix cin, Salix aur, Salix pen, Ulmus gla, Fraxi exc, Vibur opu.*
Locally frequent in Oswestry uplands; Central hills; Clee hills and SW: sparse in NE and absent from large parts of region.

Cherry laurel
***Prunus laurocerasus** L.
Planted for ornament or game cover; established and persisting locally in woods, park gardens and hedges, though severely damaged by the hard winter of 1981–82.

Small-leaved cotoneaster
***Cotoneaster microphyllus** Wall. ex Lindley



Bird-sown and established as a garden escape most commonly on limestone where it may persist for many years. Locally frequent in Oswestry upland; scattered records elsewhere. Generally in quarries or mine works.

Himalayan cotoneaster
***Cotoneaster simonsii** Baker
Spreads vigorously by bird-sown seed in gardens.
Occasionally etablished in the wild as on Llanymynech Rocks and two localities in E of region.

***Cotoneaster bullatus** Bois
Reported on school wall, Much Wenlock (1978 K E Bull); and old railway track, Oswestry (1979 BD) in 1982 *BSBI News* No 32, 18.

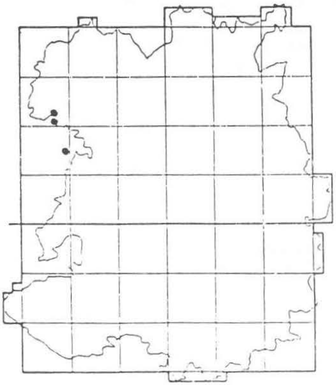
Firethorn
***Pyracantha coccinea** Roem.
Firethorn itself is not thought to be naturalised in the region. In the summer of 1983, however, a curious seedling was found in the garden of one of the authors (CAS) at Mytton near Shrewsbury. It appears to be intermediate in vegetative characters between *P. coccinea* and *Crataegus monogyna* (or possibly *C. laevigata*). Dr C A Stace shares the opinion that this may well prove to be a spontaneous and previously unknown intergeneric hybrid. If the solitary specimen survives to flower and to be critically confirmed, the 'Mytton thorn' will be fully described and named elsewhere.

Midland hawthorn
***Crataegus laevigata** (Poiret) DC.
(*C. oxyacanthoides* Thuill.)
Probably nowhere native in region but commonly planted in hedges, parks and gardens as an ornamental tree, usu in the pink-flowered form.

Hawthorn
'Quick', 'Nippanaws'
Crataegus monogyna Jacq.
Hedges, scrub and open woodland or as scattered specimens on grazed hillsides, on damp to dry soils, PN poor to rich, base med to rich, acid to calc, sun to ½ shade. As a wild shrub or tree, a vigorous invader of ungrazed or abandoned pastures, where it may persist long after grazing pressure increases again (as on the Long Mynd); forms dense thickets on old railway lines and other tracks, though gradually shaded out by taller trees such as oak and sycamore in mature woodlands. The commonest shrub in agricultural field hedges, modern ones often being composed entirely of this species. Ass: *Coryl ave, Sambu nig, Acer cam, Vibur opu, Cornu san, Prunu spi.*
Abundant throughout region.

Rowan, Mountain ash
'Wicky', 'Quicken tree', 'Witch-tree'
Sorbus aucuparia L.
Open woods, scrubby hilsides, moorland, heath and hedgebanks, on dry to damp but well-drained sandy or loamy soils or peat or among rocks, PN poor, base med to poor, acid, sunny or ½ shaded, often v. exposed; rarely dominant, not long-lived but v. fruitful, seedlings often abundant near parent trees but soon destroyed if grazing is heavy. Ass: *Betul pen, Ilex aqu, Quercu pet, Cytis sco, Ulex eur.*
Widespread throughout region but much commoner in upland, ascending higher than other trees, to 1700′ on Stiperstones; characteristic of unproductive marginal land. Increase?
At The Hollies several large rowans – presumably bird-sown above grazing reach – sprout from the crowns of ancient holly trees, whose cloven trunks embrace their anchoring roots.

English whitebeam
Sorbus anglica Hedl.



Crevices in limestone and dolerite cliffs, mostly near top, exposed, sunny, ungrazed. Ass: *Crata mon, Fraxi exc, Prunu spi, Rosa pim, Taxus bac, Pinus syl, Sorbu rup.*
V. rare: Blodwel Rock; Craig Breidden. (See p. 344.)

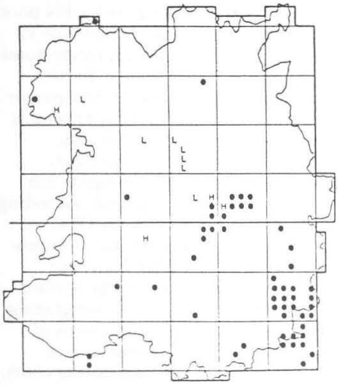
Common whitebeam
***Sorbus aria** (L.) Crantz
Commonly planted as an ornamental tree but not naturalised or wild within the region.
A surprising record from Westcott Hill near Pulverbatch in *RBF* 1940.

Rock whitebeam
Sorbus rupicola (Syme) Hedl.
Crevices in limestone and dolerite cliffs, v. rare: Blodwel Rock; Craig Breidden. (See p. 344.)

$ Sorbus porrigentiformis E.F. Warburg
Recorded *FPW* for SJ 21. (See p. 344.)

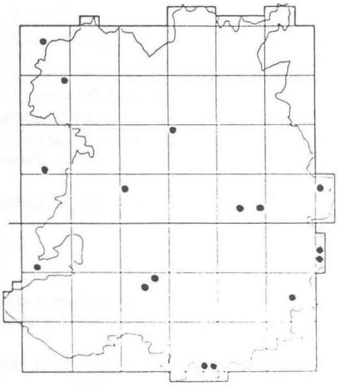
$ Sorbus leptophylla E.F. Warburg
Reported from Craig Breidden in 1955 and by RGW in 1977. (See p. 344.)

Wild service-tree
Sorbus torminalis (L.) Crantz
Open woodland, scrub, rock outcrops and hedges on dry to damp but well drained soils, PN med, base med to rich, acid to calc, ½ shade to shade. A



characteristic member of the ancient mixed broad-leaved woodland community together with holly, yew and small-leaved lime on sandstones and other freely drained acid rocks as well as on limestone. Ass: *Tilia cor, Fraxi exc, Querc pet, Prunu avi, Taxus bac, Ilex aqu, Ulmus gla.*
Locally frequent along Wenlock Edge from Ironbridge to Craven Arms; in Wyre Forest; and scattered along Lower Severn and tributary valleys: rare elsewhere.

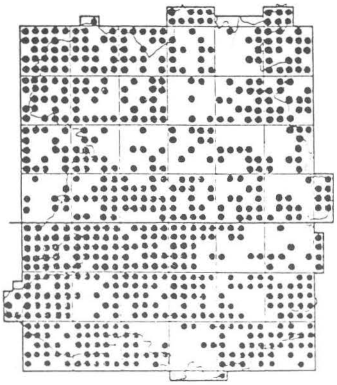
Wild pear
***Pyrus pyraster** Burgsd.
(*P. communis* auct).



Doubtfully native but long established in hedges, woodland margins, former orchards and as isolated field trees.
In a few scattered localities throughout region except NE.

Crab apple
Malus sylvestris Miller

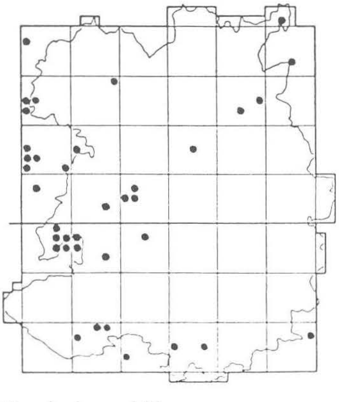
Old broad-leaved woodland, scrub, hedges, quarries, parks and abandoned gardens and orchards on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Generally as scattered individuals, undoubtedly wild in some old woodland sites and, like hawthorn, as an invader of derelict pasture, but also commonly planted for its former economic value.



The two sspp. (**sylvestris** and ***mitis** (Wallr.) Manst.) were distinguished in the survey but not consistently mapped: the former occurs in old woodland.
Frequent throughout region.

STONECROP FAMILY
CRASSULACEAE

Orpine, Livelong
Sedum telephium L.

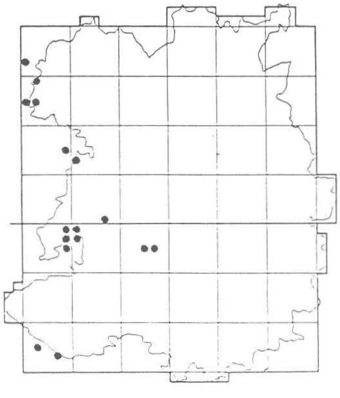


Dry shady roadside verges, open woods and scrub esp on rocky slopes or stable screes with shallow soils, PN poor, base med, mod acid to neut, sun to ½ shade, sheltered, intolerant of grazing and compet with tall grasses, perhaps salt tolerant; in mid Wales it is locally common along the base of rocky roadside verges in the spray zone from the wheels of passing traffic. Ass: *Origa vul, Solid vir, Digit pur, Viola riv, Lathy mon.*
Locally frequent in the W of region: sparse in NE and S; generally avoiding limestone areas.
The sspp. **telephium** and **fabaria** (Koch) Kirschleger have not been distinguished in this survey, but the latter is probably the more frequent.

***Sedum spurium** Bieb.
Occasionally naturalised in dry shady places on rock or concrete. Tong; Devil's chair, near Knucklas.

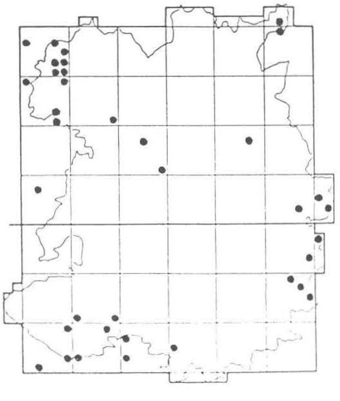
Thick-leaved stonecrop
***Sedum dasyphyllum** L.
Ludlow (SO 5074) (1975 PHO).
Shown in *ABF* for SO 39, 57 and 68.

English stonecrop
Sedum anglicum Hudson



Rock outcrops and shallow turf on hills usu in pockets of thin peat or organic soil with mosses but also on wall tops, on damp to moist but intermittently dry soil, PN poor, base poor, v. acid to acid, sunny, exposed, humid. A typical pioneer plant on flat rocky surfaces in upland areas of high rainfall. Ass: *Festu ovi, Agros cap, Galiu sax, Poly juni, Rhac* spp., *Cera purp.*
Frequent, locally abundant in extreme W of region at higher altitudes: sparse elsewhere: v. rare on Shropshire plain where it occurs only as a garden escape.

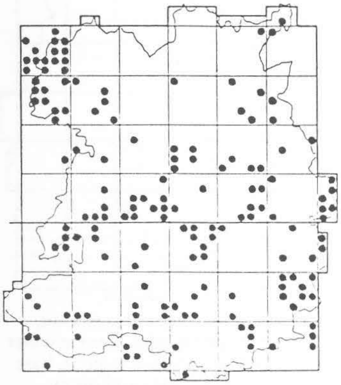
White stonecrop
***Sedum album** L.



Wall tops, quarries, scree, rocky banks, stone paths, railway lines on shallow stony soils esp limestone, PN poor, base med to rich, mod acid to calc, sunny, exposed. Usu an obvious garden escape and doubtfully native in this region. Ass: *Ceter off, Asple rut,*

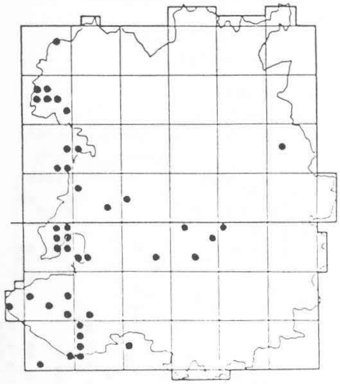
Carda hir, Poa pra, Cymba mur, Arabi tha.
Locally frequent in Oswestry upland; Ludlow; Bucknell area; Bridgnorth area: sparse in the Shropshire plain.

Biting stonecrop, Wall pepper
'Creeping sailor', 'Peddlar's basket'
Sedum acre L.



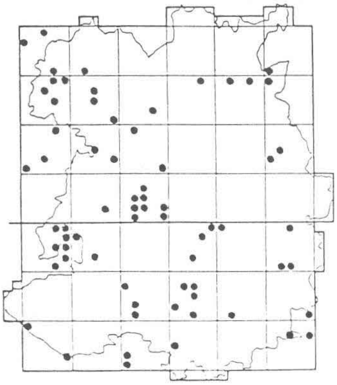
Walls, screes, stablised mine-waste, limstone ballast and other stony areas on shallow dry soils, PN poor, base med to rich, neut to calc, sunny, exposed. A late pioneer in open often man-made habitats and a v. drought-tolerant succulent. Ass: *Erodi cic, Cymba mur, Eroph ver, Aphan arv, Veron arv.*
Locally frequent in Oswestry uplands, Shrewsbury; Minsterley; Church Stretton area; Lower Severn Valley: local to sparse elsewhere.

Rock stonecrop
Sedum forsteranum Sm.



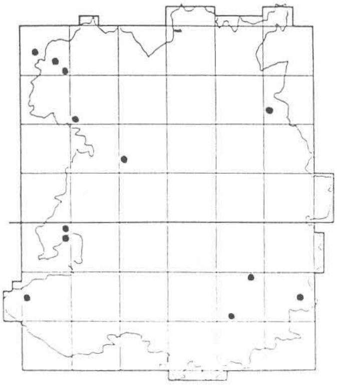
Rock outcrops, stablised scree and stony banks, naturalised or planted on walls, typically associated with dolerite and other basic igneous rocks on thin dry soils, PN poor, base med to rich, mod acid to neut (rarely calc), sun to ½ shade, exposed. A poor competitor with taller grasses or woodland herbs but tolerant of drought and disturbance. Ass: *Teucr sco, Geran rob, Umbil rup, Polyp int, Asple adi, Poa nem, Dicr scop.*
V. locally frequent in Oswestry uplands; Breidden hills; W Central hills; parts of Clun Forest; extending E as far as Much Wenlock. Appears truly native in this region, where it is more frequent in suitable habitats than in most other parts of its British range. (For this reason it was chosen as the 'cover plant' for this book).

Reflexed stonecrop
***Sedum reflexum** L.



Naturalised and well established on walls and grassy spoil banks (e.g. at Snailbeach), esp in W and S of region: sparse in NE.

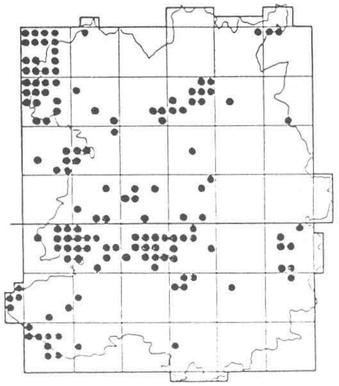
House-leek, 'Sinna green'
***Sempervivum tectorum** L.



Long established on garden walls and slate or stone roofs of old outbuildings. Mainly in W and SE of region.

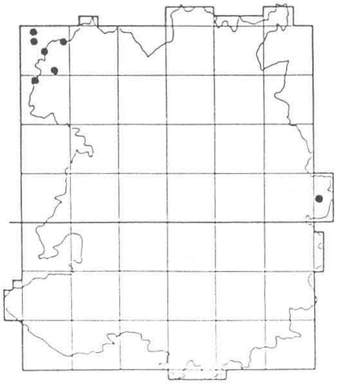
Navelwort
Umbilicus rupestris (Salisb.) Dandy

Crevices in rocks and walls esp sandstones, siltstones and dolerite, usu avoiding limestone and v. base-poor rocks (e.g. quartzite), on stable scree and steep dry hedge-banks, rooted in fine damp soil, PN poor to med, base med, mod acid, cool but sunny (upland) or ½ shaded (lowland), wilts in severe drought. Ass: *Asple adi, Digit pur, Poa nem, Polyp vul, Teucr sco.*
Frequent in Oswestry upland; Central hills; New Red Sandstone hills in N plain: locally frequent in Clun Forest; Bridgnorth area: sparse elsewhere.



SAXIFRAGE FAMILY
SAXIFRAGACEAE

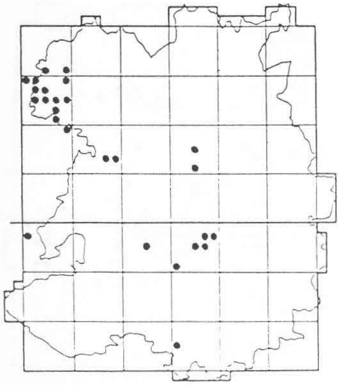
Londonpride
***S. × urbium** D.A. Webb
(*Saxifraga spathularis* Brot. × *S. umbrosa* L.)



Occasionally naturalised in old gardens, woods, shady waste places. Local in Oswestry uplands: one record near Tong.

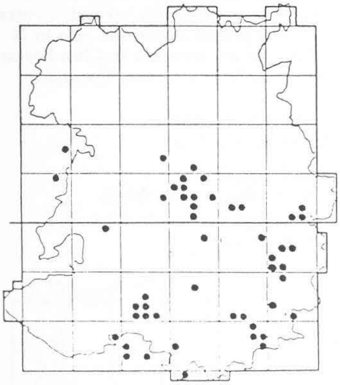
Rue-leaved saxifrage
Saxifraga tridactylites L.

Open spring-annual community in shallow soil pockets on rock (usu limestone), wall-tops or bare patches in grassland, soil fine or sandy to stony, PN poor, base rich, neut to calc, humus-rich, winter-moist, summer-dry, sunny and warm, poor competitor. Ass: *Aphan arv, Arena ser, Ceras sem, Eroph ver, Enca vulg.*
Locally frequent in limestone of



Oswestry upland; and Wenlock Edge; rare elsewhere.

Meadow saxifrage
Saxifraga granulata L.

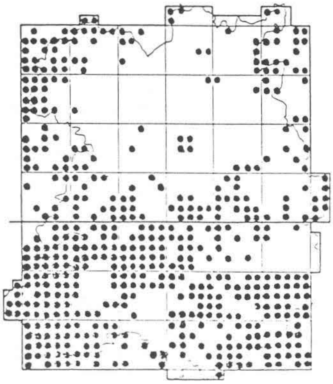


Old pastures and meadows on dry to moist but well-drained loamy soils, PN poor to med, base med to rich, mod acid to calc, sunny to ½ shaded, regularly but not heavily grazed or mown, unploughed. Ass: *Agros cap, Antho odo, Campa rot, Galiu ver, Lotus cor.*
Locally frequent in Atcham, Condover, Cressage area: Ludlow area: Bridgnorth–Bewdley esp along Severn Valley Railway. An indicator species of old grassland: marked decrease through habitat loss.

Mossy saxifrage
Saxifraga hypnoides L.

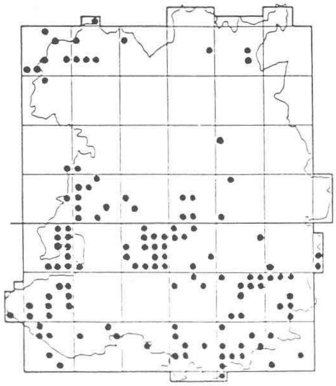
An upland species formerly native on edges of stable scree or open turf on basic rocks.
Probably extinct in its old localities on Titterstone Clee and on Breidden Hill (v c 47), but recently reported as a garden escape on a roadside near Boningale; also recorded in v c 47 on rough walls and rocks around Old Church Stoke and Hyssington and on Corndon Hill in 1940 by J A Webb (MS *Flora of Monts.*).

Opposite-leaved golden-saxifrage
Chrysosplenium oppositifolium L.



Springs, flushes, stream-banks and wet rocks, constantly moist with seeping water, usu on clay, PN med to rich, base med to rich, mod acid to neut, sheltered, cool and often shaded, poor competitor with larger plants but can form extensive pure patches. Ass: *Carda fle, Carex rem, Monti fon, Ranun rep, Brac rivu.*
Frequent throughout upland and Lower Severn Valley: sparse in N. Shropshire plain.

Alternate-leaved golden-saxifrage
Chrysosplenium alternifolium L.



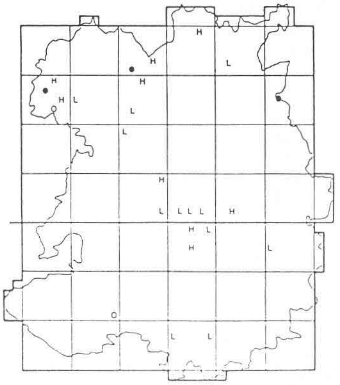
Shaded sites on stream banks and damp hollows in valley woods (esp alder), on moist or sometimes flooded clay or loamy soils, PN med, base rich, mod acid to neut, cool and dark, poor competitor. Ass: *Alliu urs, Athyr fil, Carda fle, Chrys opp, Pell epip.*
Locally frequent in upland margins and valleys: rare in lowland.

***Tellima grandiflora** (Pursh) Dougl. ex Lindl.

Bishops Castle; naturalised around base of hawthorn on rough uncultivated ground used as graveyard (1982 SMN).

GRASS-OF-PARNASSUS FAMILY
PARNASSIACEAE

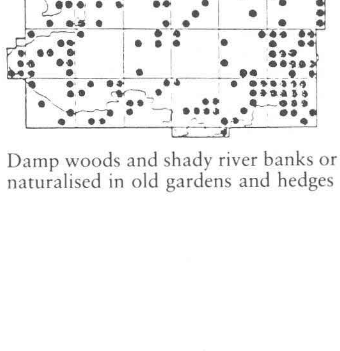
Grass-of-Parnassus
Parnassia palustris L.



Old and species-rich wet meadows, short fen or spring-mire, seeping water on peat or clay, PN med to poor, base rich, neut to calc, open and sunny, sometimes grazed and trampled by livestock. Ass: *Carex lep, Epipa pal, Galiu uli, Sagin nod, Valer dio.*
Survives near Ellesmere and Oswestry. Formerly known from a number of localities in Oswestry uplands; Ellesmere – Baschurch area; Condover – Cressage area; S of Clee hills; Bridgnorth; Sambrook; and Clun. Melvill in *RBF* 1920 writes "This, one of the most curious and beautiful of our native plants, is recorded by Rev W. A. Leighton in his Flora of Shropshire, p. 136, to be 'never very common', but it seems to us infinitely rarer now, and we fear it may be slowly dying out." (See p. 164.)
Severe decrease: endangered.

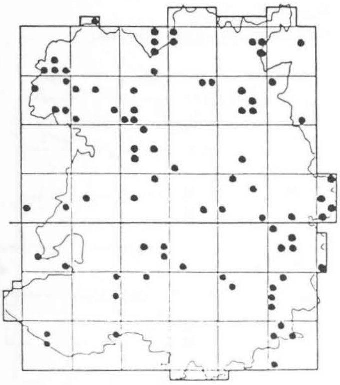
GOOSEBERRY FAMILY
GROSSULARIACEAE

Red currant
Ribes rubrum L.
(*R. sylvestre* (Lam.) Mert. & Koch)



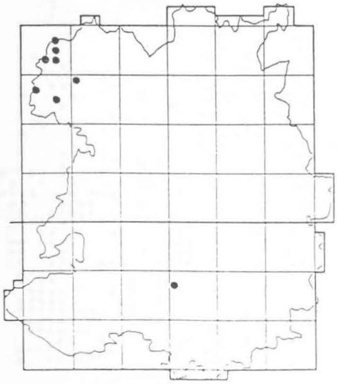
Damp woods and shady river banks or naturalised in old gardens and hedges on moist loam or clay, PN med, base rich, mod acid to neut, ½ shade, sheltered, ungrazed, usu solitary and never abundant. Ass: *Alnus glu, Fraxi exc, Salix cin, Sambu nig, Ulmus gla.* Frequent in Oswestry uplands; Lower Severn Valley; locally frequent to sparse elsewhere in region.

Black currant
Ribes nigrum L.



Naturalised in hedges and old gardens, perhaps native in alder woods on moist peat or clay, PN rich, base rich, mod acid, sheltered and shady, ungrazed. Generally solitary and never abundant. Ass: *Vibur opu, Salix cin, Frang aln, Alnus glu, Carex ela, Carex pata.* Less common than red currant: v. locally frequent in scattered localities from Oswestry upland to Bridgnorth; Market Drayton areas: sparse in S hill country.

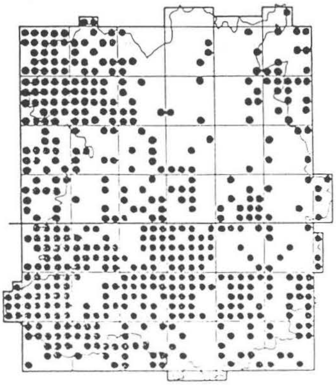
Mountain currant
***Ribes alpinum** L.



Occasionally escaped and naturalised in hedges and old quarries and on derelict walls on limestone: appears to have been used as a hedging plant for estate hedges around Pant Glas and Selattyn.

V. locally frequent in Oswestry uplands: one record near Aston Munslow.

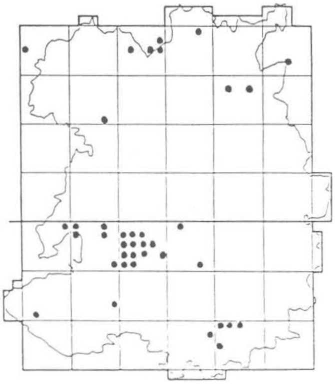
Gooseberry
'Faiberry'
Ribes uva-crispa L.



Hedges, open woodland and quarries, old walls and gardens, often associated with limestone on damp to dry soils, PN med, base rich, mod acid to calc, sun to ½ shade, sheltered, ungrazed. Ass: *Coryl ave, Cornu san, Crata mon, Rosa can, Prunu spi.*
Frequent throughout uplands esp on limestone and other basic soils: sparse to locally frequent in NE plain.

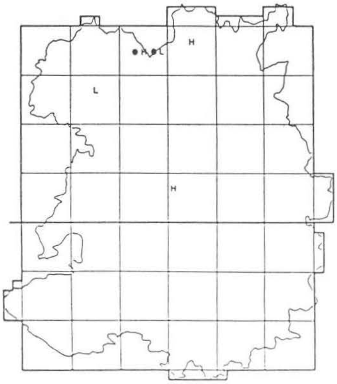
SUNDEW FAMILY
DROSERACEAE

Round-leaved sundew
Drosera rotundifolia L.



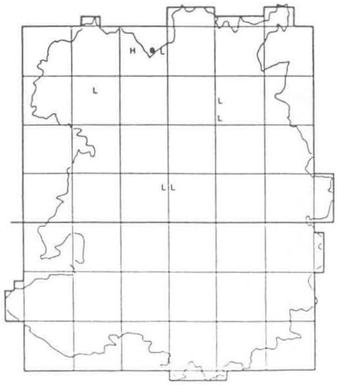
Hollows, sphagnum lawns and bare patches on boggy moor or damp heath, wet to moist at surface, on peat or raw humus, PN poor, base poor, v. acid to acid, sunny but sheltered, poor competitor. Ass: *Erica tet, Eriop ang, Vacci oxy, Spha papi, Spha recu.*
V. locally frequent on Long Mynd and nearby hills: Catherton; Whixall and other Mosses in N plain. Severe decrease.

Great sundew
Drosera anglica Hudson



Wet hollows and sphagnum lawns in old peat cuttings on bogs, usu growing on wet sphagnum itself, PN poor, base poor, v. acid, sunny but sheltered, poor competitor. Ass: *Rhync alb, Vacci oxy, Eleoc mul, Erica tet, Narth oss, Spha recu.*
V. rare: Wem Moss Nature Reserve and two other nearby Mosses. Formerly recorded from West Felton; Shomere; Whitchurch Heath.
The hybrid *D. anglica* × *rotundifolia* (**D.** × **obovata** Mert. & Koch) has been recorded from Wem Moss and Clarepool Moss (1965 CAS).

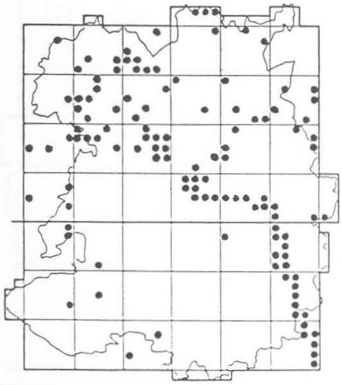
Oblong-leaved sundew
Drosera intermedia Hayne



Bare patches of wet peat and sphagnum-filled hollows in bog, wet, PN poor, base poor, v. acid, sunny but sheltered. The sundew least tolerant of compet. Ass: *Erica tet, Eriop ang, Vacci oxy, Spha tene, Spha rube.*
V. rare: Wem Moss Nature Reserve. Formerly recorded from several other Mosses and heaths in N Shropshire plain.

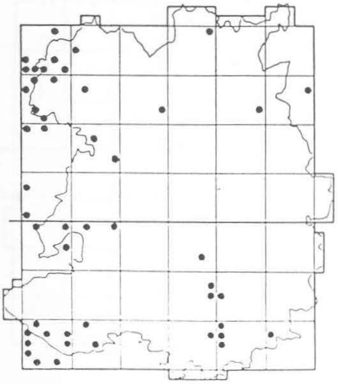
LOOSESTRIFE FAMILY
LYTHRACEAE

Purple-loosestrife
Lythrum salicaria L.



In reedbeds at the edges of lakes and slow moving water, riverbanks and marshy fields, on moist to damp often winter-wet mud, silt or peat, PN med to rich, base med, mod acid to neut, sunny, sheltered, tolerant of some grazing and trampling. Ass: *Filip ulm, Angel syl, Stach pal, Alism pla, Biden cer, Carex otr.*
Frequent to abundant along R. Severn and major tributaries, locally frequent elsewhere in N plain; sparse in W and S: absent from upland areas.

Water-purslane
Lythrum portula (L.) D. A. Webb
(*Peplis portula* L.)

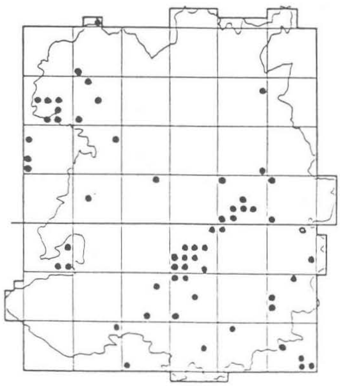


Springs, flushes, patches of shallow standing water and edges of field ponds, sometimes summer-dry, on mud or clay, PN poor, base med, mod acid, sunny. A short turf species intolerant of compet. Ass: *Monti fon, Stell als, Agros sto, Carda fle, Myoso sec, Ranun hed.*
Locally frequent in Oswestry upland; Clee hills; W Central hills; SW Clun Forest: rare elsewhere.

DAPHNE FAMILY
THYMELAEACEAE

Mezereon
***Daphne mezereum** L.
One plant on overgrown railway station at Edgerley (1978 SS): a garden escape here as in its earlier localities in Farley Dingle and at Clee Hill.

Spurge-laurel
Daphne laureola L.



Woodland margins and clearings, scrub and hedges esp on limestone on dry stony soils, PN med, base rich, neut to calc, sheltered, ½ shade to shade, immune to grazing. Sometimes the only member of shrubby understorey in dense limestone woods. Ass: *Coryl ave, Ribes uva, Clema vit, Taxus bac.*
Locally frequent in Oswestry upland; along Wenlock Edge: scattered records elsewhere in W and S.

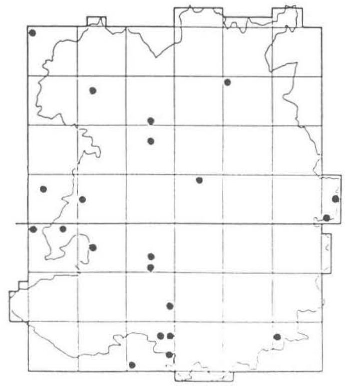
WILLOWHERB FAMILY
ONAGRACEAE

Great willowherb
'Custard cups', 'Thunderflower'
Epilobium hirsutum L.
Ditches, ponds, banks of rivers and canals on wet to damp soils, sometimes in standing water, PN rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered. A vigorous competitor characteristic of the most fertile soils but intolerant of grazing. Ass: *Ranun rep, Urtic dio, Solan dul, Rumex obt, Glyce max, Phala aru, Eupat can.*
Abundant in suitable habitats throughout region except at highest altitudes.

Hoary willowherb
'Pedlar'
Epilobium parviflorum Schreber
Ditches, banks of rivers, streams and canals, pond margins and wet hollows in fields, on wet to moist often flooded soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered, intolerant of grazing. Ass: *Carex amis, Menth aqu, Myoso sco, Galiu pal, Senec aqu.*
Frequent throughout region.

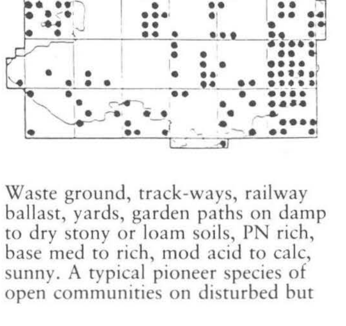
Broad-leaved willowherb
Epilobium montanum L.
Woodland, scrub, shady banks and track sides on damp to dry loam or clay soils, PN med, base med to rich, mod acid to calc, shade to ½ shade, sheltered, ungrazed. Ass: *Mercu per, Circa lut, Geum urb, Viola riv, Lysim nem, Primu vul, Dryop fil.*
Frequent throughout region.

Pale willowherb
Epilobium roseum Schreber



Banks of ditches and streams, damp woodland edges and gardens and roadside verges on wet to damp soils, PN rich, base med to rich, mod acid to calc, ½ shade, sheltered, ungrazed. Ass: *Atrip pat, Elymu rep, Matri mat, Sparg ere.*
Sparse but probably under-recorded: commoner in W of region.

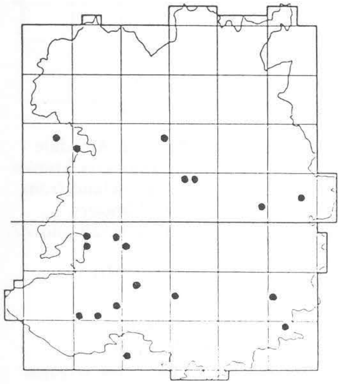
American willowherb
***Epilobium ciliatum** Rafin.
(*E. adenocaulon* Hausskn.)



Waste ground, track-ways, railway ballast, yards, garden paths on damp to dry stony or loam soils, PN rich, base med to rich, mod acid to calc, sunny. A typical pioneer species of open communities on disturbed but

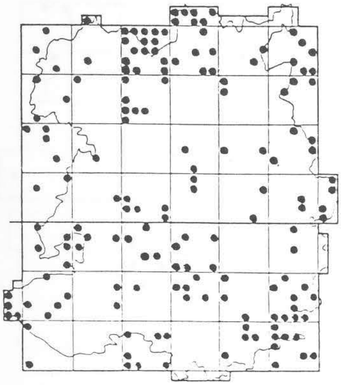
nutrient rich stony ground. Ass: *Poa ann, Poa pra, Matri mat, Sisym off, Senec squ.*
A well-established casual still spreading since its first recorded occurrence in late 1950s (FHP); not mentioned in *LRH*. Frequent throughout region.

Square-stalked willowherb
Epilobium tetragonum L.
(*E. adnatum* Griseb.)



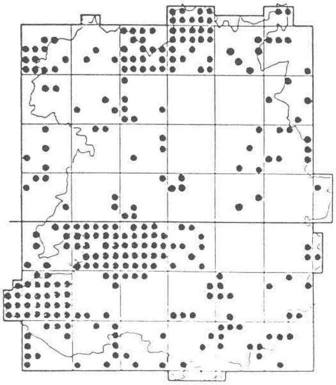
Woodland rides, banks and dingles, tips, neglected yards and bases of walls, on damp to moist soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade, warm, sheltered. A plant of marginal communities with low compet. Ass: *Geran rob, Glech hed, Geum urb, Circa lut, Ranun fic, Rumex san.*
Sparse or under-recorded: mainly in SW.

Short-fruited willowherb
Epilobium obscurum Schreber



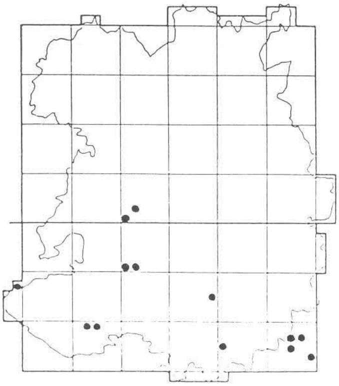
Margins of streams, springs, ditches and canals, poached verges, woodland rides and clearings, on moist to damp, winter-wet or intermittently flooded soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade, sheltered. Usu ungrazed but occurs in flushes on upland sheepwalks. Ass: *Agros sto, Carda fle, Carex rem, Carex pcea, Holcu lan, Juncu eff.*
Probably frequent throughout region but unevenly recorded.

Marsh willowherb
Epilobium palustre L.



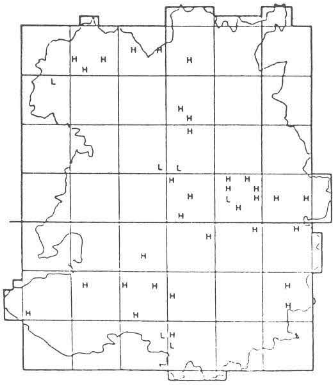
In short fen, springs and flushes, sides of ponds and streams and damp grassland on wet to damp peat, clay or loam, PN poor, base med, mod acid to neut, sunny, sheltered, intolerant of compet with tall sedges and of heavy grazing, so restricted to less vigorous flush communites. Ass: *Myoso lax, Myoso sec, Poten pal, Glyce flu, Carda pra, Veron scu, Carex nig, Calth pal.*
Frequent in W Central hills; Clee hills; Ellesmere – Whitchurch area: locally frequent in Oswestry upland; Clun Forest; Welshpool area: sparse elsewhere.

New Zealand willowherb
***Epilobium brunnescens** (Cockayne) Raven & Engelhorn
(*E. pedunculare* auct.;
E. *nerterioides* auct.)



Well naturalised and still spreading on upland stream banks, wet flushes, springs and damp forestry tracks. Scattered through hill country in S of region and Wyre Forest. First record from Carding Mill Valley and Church Stretton (1929 *RBSEC*).

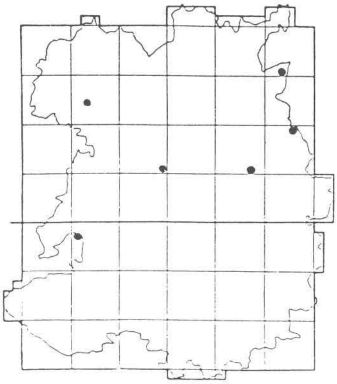
Rosebay willowherb
'Cat's eyes'
Chamerion angustifolium (L.) J. Holub
(*Chamaenerion angustifolium* (L.) Scop.;
Epilobium angustifolium L.)



(Early records only)

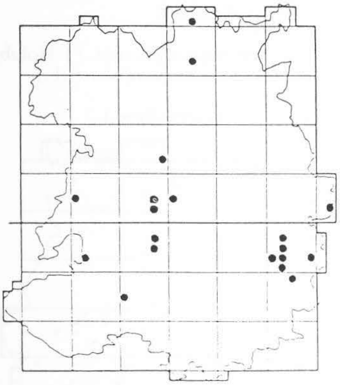
Waste ground, building sites, railway yards, woodland clearings, open scrub, tracksides, verges, gardens on damp to dry soils, PN med to rich, base poor to rich, acid to calc, a perennial pioneer and v. vigorous competitor often forming extensive pure stands. Intolerant of heavy grazing, deep shade and water-logged soils but favoured by burning and disturbance of ground. Ass: *Rubus ida, Urtic dio, Arrhe ela, Rumex obt, Elymu rep, Holcu lan.*
The remarkable spread of rosebay willowherb over the last century and a half is well shown by the mapping of records in *LFS* and *HFS* but is still not properly understood.
Frequent to abundant throughout region.

Common evening-primrose
***Oenothera biennis** L.



Naturalised on waste ground, building sites, roadside verges and paths, often in towns.
At several places in N Shropshire.

Large-flowered evening-primrose
***Oenothera erythrosepala** Borbás



Naturalised in sand pits, quarries, waste ground, footpaths and roadside verges, generally on light dry sandy soils.
The commonest evening-primrose in the region: near Dorrington and in the Bridgnorth area: scattered localities elsewhere.

Fragrant evening-primrose
***Oenothera stricta** Ledeb. ex Link
Naturalised on a steep roadside bank at Bridgnorth (1982 BRF).

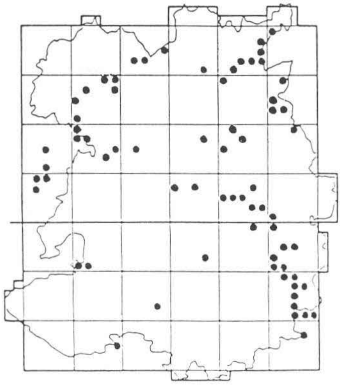
Common enchanter's-nightshade
Circaea lutetiana L.
Woodland, plantations and shady banks on damp to dry clay or loamy soils, PN med to rich, base med to rich, mod acid to neut, shade to ½ shade, sheltered, ungrazed, often in pure stands. Ass: *Mercu per, Epilo mon, Geum urb, Glech hed, Viola riv, Primu vul.*
Frequent in wooded areas throughout region.

Upland enchanter's-nightshade
Circaea × intermedia Ehrh.
(*C. alpina* L. × *lutetiana*)
Intermittently flooded stream banks in woodland on moist to damp stony clay soils, PN med, base med, mod acid to neut, shaded, sheltered, ungrazed. Ass: *Alliu urs, Ajuga rep, Carex rem, Athyr fil, Chrys alt, Carda fle.*
Rare: banks of Habberley Brook on Earls Hill Nature Reserve and at several localities down stream as far as Hinton. Formerly recorded at Meole Brace on the same river system (1915 *RBF*), later (1916) altered – incorrectly – to *C. alpina*.
C × intermedia often occurs in the absence of its parent *C. alpina*.

WATER-MILFOIL FAMILY HALORAGACEAE

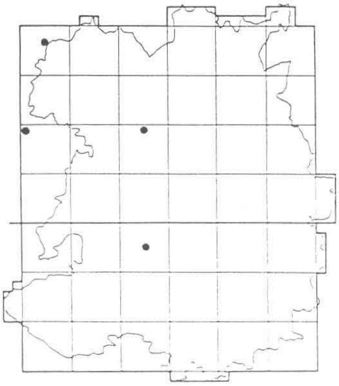
Whorled water-milfoil
Myriophyllum verticillatum L.
Recorded in R Severn near Royal Hill Inn, Cae Howel (1979 SS); near Isle Grange, Bicton (1979 MJC) with river water-crowfoot. No doubt under-recorded.

Spiked water-milfoil
Myriophyllum spicatum L.



Rivers, meres, canals and pools, often in fairly deep or swift water, PN rich, base rich, neut to calc, rooted in fairly stony bottom but reaching surface to flower. Ass: *Ranun flu, Zanni pal, Potam pec.*
R. Severn and main tributaries: disused branches of canal: meres near Ellesmere. Locally frequent.

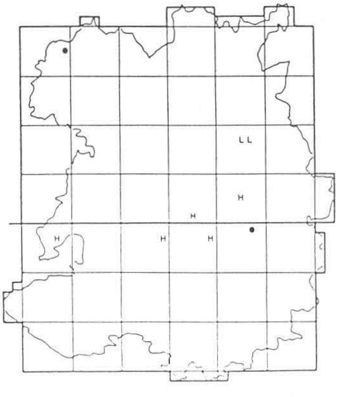
Alternate water-milfoil
Myriophyllum alterniflorum DC.



Reported from R. Perry and R. Vyrnwy; from a small pool in Church Stretton golf course; and a pool in damp pasture near Craignant. Ass: *Equis flu, Eleoc pal, Sparg ere.*
Probably under-recorded.

MARE'S-TAIL FAMILY HIPPURIDACEAE

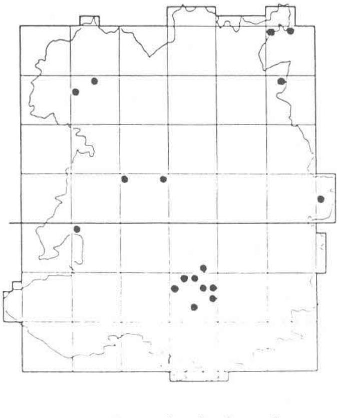
Mare's-tail
Hippuris vulgaris L.
A large patch in SW corner of Willey Pool near Broseley (1978 DLK); in ornamental pond at Moreton Hall school where it was introduced many years ago, allegedly from Ainsdale Dunes (1982 MW). Formerly known at several localities in lowland from Acton Burnell to Wealdmoors. Recorded in *ABF* from SO29 and 77.



WATER-STARWORT FAMILY CALLITRICHACEAE

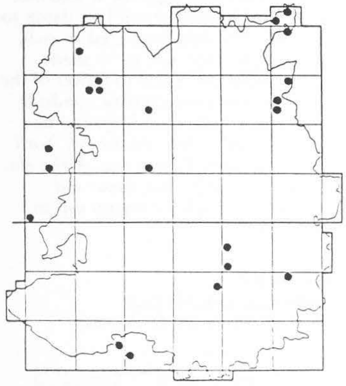
Common water-starwort
Callitriche stagnalis Scop.
Ponds, pools, ditches, slow streams and rivers, winter-wet hollows in fields, in shallow water or on wet mud, PN med to rich, base med to rich, neut to alk, sun to ½ shade, v. variable (esp between aquatic and 'terrestrial' forms), usu annual but sometimes over-wintering. Ass: *Ranun sce, Polyg hyd, Lemna min, Myoso sco, Agros sto, Biden cer.*
The commonest water-starwort throughout region.

Various-leaved water-starwort
Callitriche platycarpa Koch



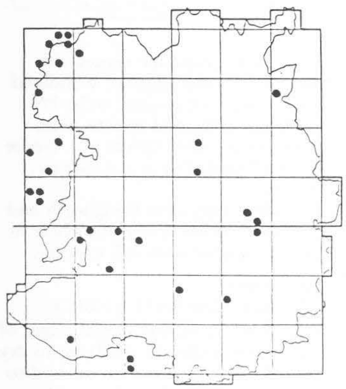
Springs, small ponds, ditches, slow rivers and steams, in shallow water or wet mud, PN med to rich, base med to rich, neut to alk, sun to ½ shade. Ass: *Hydro vul, Monti fon, Stell als, Glyce dec, Lotus uli.*
Apparently frequent in Corve Dale area; sparse elsewhere. Unevenly mapped but probably under-recorded.

Blunt-fruited water-starwort
Callitriche obtusangula Le Gall



Ponds, ditches, slow streams and rivers, disused canals in shallow water, often on peat or organic mud, PN med, base med to rich, mod acid to alk, sunny. Ass: *Hotto pal, Ranun sce, Nupha lut, Glyce max, Potam nat, Elode can.*
Locally frequent in NW (canal) and NE: sparse elsewhere but probably under-recorded.

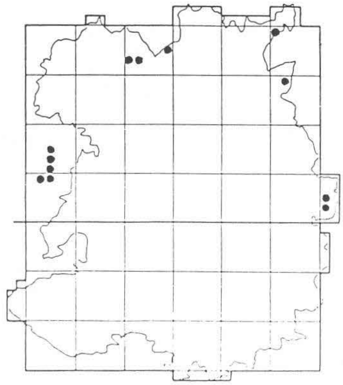
Intermediate water-starwort
Callitriche hamulata Kütz. ex Koch
(*C. intermedia* Hoffm.)



Ponds, ditches, slow streams and rivers, disused canals and shallow lakes in clear water (occasionally on bare mud), PN poor to med, base poor to med, mod acid to neut (rarely calc), sunny. Ass: *Potam nat, Ranun pel, Monti fon, Sparg eme.*
Locally frequent in W of region: sparse elsewhere.
The commonest starwort in clear acid and peaty waters.

Callitriche brutia Petagna
(*C. pedunculata* DC.)
Reported from a hill top pool called Church Pool, near Old Church Stoke, which dries up in the summer (1981 JMP det ICT); Llyn Rhuddwyn (1981 ICT); and from pond in Deer Park, Attingham Park (1970 FHP).

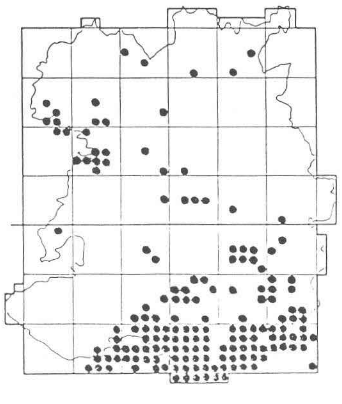
Autumnal water-starwort
Callitriche hermaphroditica L.
(*C. autumnalis* L.)



Meres, pools and disused canals in mod deep clear water, often on organic mud, PN med to rich, base rich, neut to alk, sun to ½ shade. Ass: *Luron nat, Ranun cir, Potam fri, Zanni pal.*
The most typical starwort of the Shropshire meres. V. local: meres near Ellesmere; Montgomery canal from Llanymynech to Welshpool: scattered records in E of region.

MISTLETOE FAMILY
LORANTHACEAE

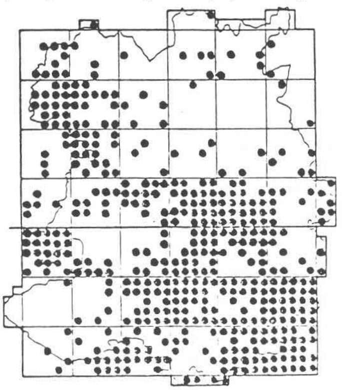
Mistletoe
Viscum album L.



Parasitic on various broad-leaved trees. A survey by BSBI members and our own records show that the host species were parasitised in the following proportions in the tetrads from which mistletoe was reported: apple 60%, hawthorn 22%, lime 5%, poplar 3%, field maple 2%, ash 2%, oak 2%, sycamore 2% Norway maple 1%, with single records from wych elm, willow and acacia.
Much commoner in S of region where it may well be native but has also become widely naturalised in apple orchards: scattered in N lowlands and the area S of Oswestry: generally absent above 700′ (213m).

DOGWOOD FAMILY
CORNACEAE

Dogwood, 'cat tree'
Cornus sanguinea L.
(*Thelycrania sanguinea* (L.) Fourr.)



In open old broad-leaved woodlands or scrub, often on limestone, notably along edges of rides and in hedgerows on dry to damp soil, PN med to rich, mod acid to calc, sun to ½ shade, sheltered from cool winds.
Occasionally forms thickets by suckering. Ass: *Euony eur, Coryl ave, Prunu spi, Crata mon, Acer cam, Salix cap, Fraxi exc.* Frequent to locally abundant throughout NW, Central and SE of area: sparse in NE: and absent from higher hills in W and SW.

IVY FAMILY
ARALIACEAE

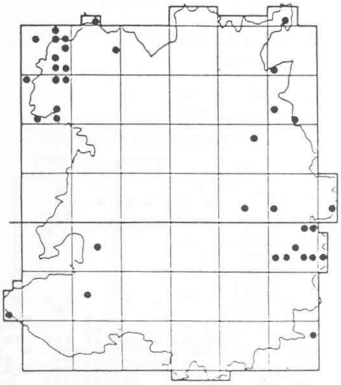
Spikenard
***Aralia racemosa** L.
North American plant, well naturalised in Badger Dingle.

Ivy
Hedera helix L.
On the ground, climbing up trees (esp sick ones) and neglected buildings, in woods, scrub, hedges, shady banks, parks and gardens, on damp to dry soils, PN med to rich, base poor to rich, acid to calc, tolerant of deep shade but generally flowering in full sunlight on wall-tops or in the crowns of trees. Often forms extensive pure patches on ground under heavy woodland canopy where little else will grow. Ass: *Ilex aqu, Taxus bac, Mercu per, Fagus syl.*

Frequent to abundant throughout region.

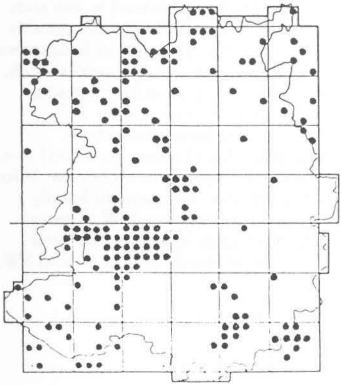
Irish ivy
Hedera helix var. **hibernica** Kirchn.
Locally frequent in gardens, parks and plantations in the Oswestry and

Bridgnorth districts: sparse elsewhere in W and E: apparently absent from centre and S of region.



UMBELLIFER FAMILY UMBELLIFERAE

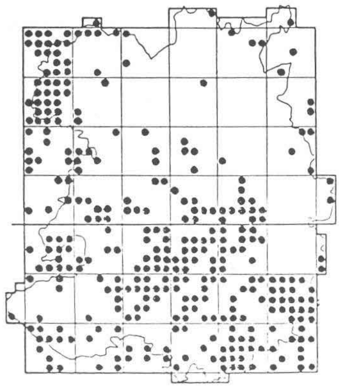
Marsh pennywort
Hydrocotyle vulgaris L.



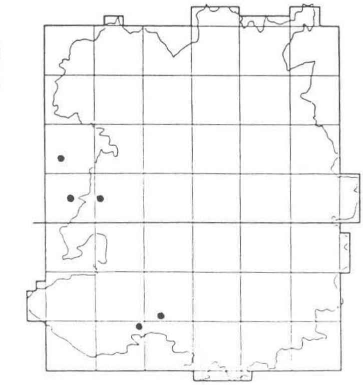
Wet peaty grassland, flushes on heathland and moorland, fens and marshy margins of pools, lakes, canals and ditches, on wet to damp peaty or clay soils, PN poor to med, base poor to med, acid to neut, sun to ½ shade, cool, sheltered. A poor competitor with tall vigorous fen plants but tolerant of trampling and fairly heavy grazing. Characteristic of short marsh-meadow turf. Ass: *Valer dio, Carex pcea, Trigl pal, Achil pta, Succi pra, Ranun fla, Viola pal, Scute gal, Galiu pal, Poly comm, Spha palu, Aula palu.*
Frequent in Oswestry uplands; W Central Hills; Clee hills; Wyre Forest; Ellesmere – Whitchurch district: sparse elsewhere: v. rare on limestone and in E plain.

Wood sanicle
Sanicula europaea L.

An indicator of ancient deciduous woodland, also found in hedgebanks and open scrub derived from former woodland, esp on limestone, on dry to damp loam or clay soils, PN med, base med to rich, mod acid to calc, shade to ½ shade. Intolerant of grazing and a poor competitor with grasses. Ass: *Lamia gal, Orchi mas, Anemo nem, Galiu odo, Melic uni, Circa lut, Paris qua.*
Frequent in Oswestry uplands; Wenlock Edge area; and SE of region: sparse in W Central hills and Clun Forest: absent from large parts of NE and E lowlands (areas from which forest was cleared earlier).



Astrantia
***Astrantia major** L.

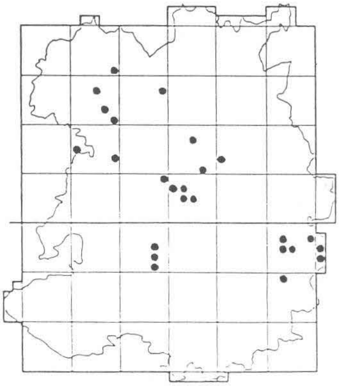


Broad-leaved woodland or former woodland on damp to dry limestone or base-rich clay soils, PN med, base med to rich, mod acid to calc, ½ shade to shade, sheltered, often forming extensive patches where it occurs but absent from many other apparently suitable sites. Its origin is still uncertain but probably an early garden escape (formerly grown for its supposed medicinal properties): found in rather different communities on the continent. Ass: *Mercu per, Circa lut, Sanic eur, Campa tra, Epilo mon.*
Rare: Stoke Wood near Craven Arms where it has been known at least since 1841 and perhaps since 1825 (see 2.6;) Clungunford; Long Mountain; Guilsfield.

Rough chervil
Chaerophyllum temulentum L.

Hedgebanks and edges of woodland, often on disturbed ground on damp to dry soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered. Third to flower of the common and characteristic roadside umbellifers, following hogweed by about 3 weeks. Ass: *Anthr syl, Toril jap, Herac sph, Elymu rep, Arrhe ela, Alope pra, Lathy pra, Linar vul.*
Frequent throughout region esp in lowlands.

Bur chervil
Anthriscus caucalis Bieb.
(*A. neglecta* Boiss. & Reuter)



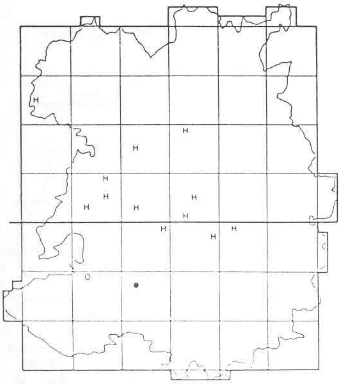
Sandy banks, roadside verges, dry grassy places and edges of woodland on light dry well drained soils, PN med, base med, mod acid to neut, sunny, warm. Ass: *Aphan arv, Geran mol, Stell med, Poa pra, Erodi cic, Valer loc.*
V. locally frequent in Bridgnorth and Berrington areas: sparse elsewhere in lowland: absent from hill country.

Cow parsley
Anthriscus sylvestris (L.) Hoffm.

Hedgebanks, roadside verges, edges of fields and woodlands, on damp to dry soils, PN rich, base rich, mod acid to calc, sun to ½ shade, tolerant of mowing 2 or 3 times a year but not heavy grazing or ploughing. The commonest roadside umbellifer and the first to come into flower. Ass: *Chaer tem, Toril jap, Arrhe ela, Elymu rep, Linar vul, Lathy pra, Herac sph.*
Abundant throughout region except for highest altitudes and hedgeless arable NE.

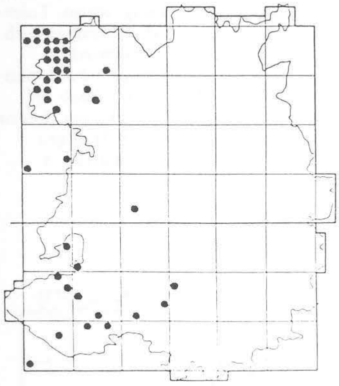
Shepherd's-needle
'Venus comb', 'Beggars needle'
†Scandix pecten-veneris L.

Extinct in region?
Last recorded from a garden near Wistanstow, germinated from spilt bird-seed. *LFS* records it in 'cornfields; abundant' without localities:



HFS lists scattered records from Oswestry through Shrewsbury area to Much Wenlock. Decreasing through changing agricultural practice.

Sweet cicely
***Myrrhis odorata** (L.) Scop.



Well established on roadside verges, rubbish tips and waste ground on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, often forming extensive clumps but seldom far from present or past habitations. Ass: *Hespe mat, Aegop pod, Anthr syl, Arrhe ela, Alope pra.*
Confined to W half of region: abundant in Oswestry uplands: locally frequent in Clun Forest area with scattered lowland records.

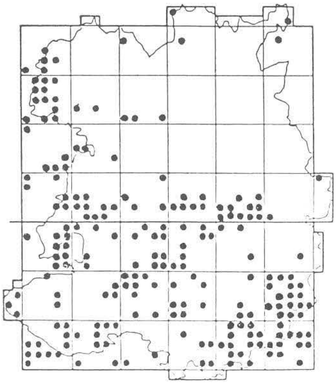
Alexanders
***Smyrnium olusatrum** L.

Established and long known on banks below Shrewsbury Castle; Ludlow Castle; and at Bank House, Pant.

Pignut
Conopodium majus (Gouan) Loret

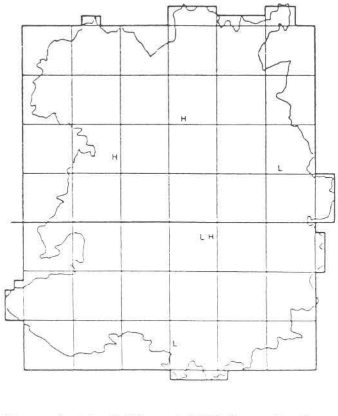
Old pastures, meadows and roadside verges, open scrub and grazed woodland on damp to dry deep soil, PN med, base med to rich, mod acid to calc, sun to ½ shade, tolerant of grazing, mowing and trampling but not of ploughing or herbicides. An indicator of old permanent pasture. Ass: *Primu ver, Rumex aosa, Centa nig, Achil mil, Cynos cri, Antho odo, Prune vul, Plant lan.*
Frequent in suitable habitats throughout region.

Burnet-saxifrage
'Bennet'
Pimpinella saxifraga L.



Old species-rich grassland in pastures, verges, banks or light open scrub, on dry to damp, well drained soils, often shallow over limestone or other basic rock, PN poor, base med to rich, mod acid to calc, sun to ½ shade, warm, tolerant of grazing. A good competitor in short turf. Ass: *Stach off, Galiu ver, Festu ovi, Hiera pil, Thymu pra, Lotus cor, Veron off, Lathy mon.*
Locally frequent in Oswestry uplands; Wenlock Edge and SE: local to sparse elsewhere in hill country and absent from much of NE lowland.

Greater burnet-saxifrage
Pimpinella major (L.) Hudson



Recorded in *LFS* and *HFS* from Ludlow; Much Wenlock area; Hilltop and Presthope, Wenlock Edge; Cardeston; Hadnall; and Redhill near St Georges on Watling Street. Also shown in *ABF* for SJ 20 and 51. Near Welshpool (1959 VJM); roadside near Haughmond Hill (1958 AMcGS); near Woore (1958 AMcGS).

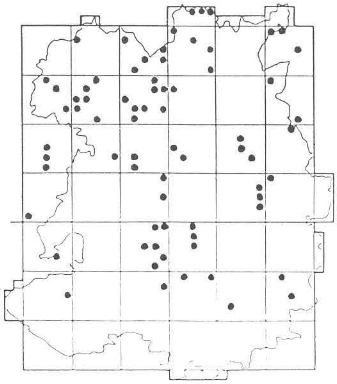
Ground-elder
***Aegopodium podagraria** L.

Roadside verges, waste ground, gardens, edges of woodland or disturbed sites, on damp soils, PN rich, base med to rich, mod acid to calc, ½ shade, sheltered, a troublesome and persistent weed regenerating from small fragments of rhizomes, often spreading to form extensive pure stands. Thought to have originated as a garden escape but now well established. Ass: *Lamiu alb, Ranun fic, Galiu apa, Anthr syl, Rumex obt.*
Frequent throughout region except at highest altitudes.

Greater water-parsnip
†Sium latifolium L.

Extinct?
Reported from a damp bank near Clun (1980 TEM). Shown in *LFS* for Wenlock Abbey and in *ABF* for SJ 32 and 43, but not recently confirmed.

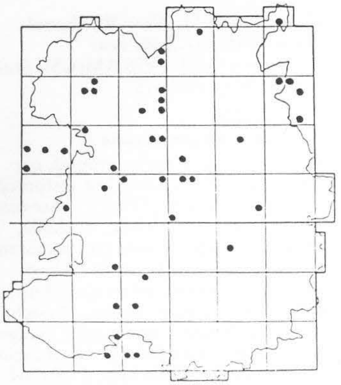
Lesser water-parsnip
Berula erecta (Hudson) Coville



Edges of canals, ponds and in ditches, slow flowing streams, rooted in mud or silt in shallow water or intermittently flooded, PN med to rich, base med to rich, neut to alk, sunny, sheltered. Tolerant of mod trampling but not of heavy grazing or shade. Ass: *Menth aqu, Myoso sco, Galiu pal, Lycop eur, Scute gal.*
Locally frequent in W half of lowlands and Church Stretton area: sparse in E and hill country.

Tubular water-dropwort
Oenanthe fistulosa L.

Edges of ponds, ditches, canals and in wet grassland and fen on moist to wet clay or peat, PN poor, base med to rich, mod acid to neut, sunny, intolerant of heavy grazing. Ass: *Hydro vul, Lychn flo, Carex pcea, Eleoc pal, Succi pra, Trigl pal, Valer dio, Galiu pal, Alism pla.*

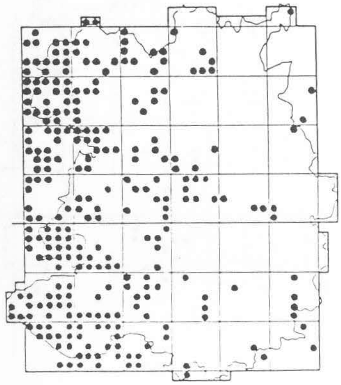


Locally frequent in NW quarter of region: sparse in SW and NE: apparently absent from SE.

Parsley water-dropwort
Oenanthe lachenalii C.C. Gmelin

Reported from canal towpath near Queen's Head (1980 PAW): formerly recorded from the Sharpstones (1872).

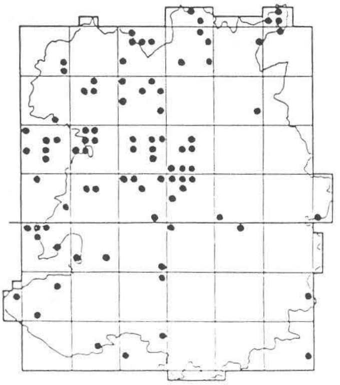
Hemlock water-dropwort
Oenanthe crocata L.



Muddy ditches, streams and river and canal banks, on wet to moist clay or silt, PN med to rich, base med, mod acid to neut, sun to shade, sheltered, vigorous and often forming extensive patches. V. poisonous but sometimes grazed. Ass: *Phala aru, Myoso sco, Menth aqu, Angel syl, Filip ulm.* A strongly westerly distribution: frequent in Oswestry uplands; Welshpool area; W Central hills; Clun Forest: locally frequent in W half of Shropshire plain: sparse in SE: absent from much of NE.

Fine-leaved water-dropwort
Oenanthe aquatica (L.) Poiret

Shallow pools and ponds with marked variation in water level, PN med, base med, mod acid to neut, rooted in bottom mud or clay, sometimes submerged but often exposed in dry seasons. Ass: *Biden cer, Ranun aqu, Polyg amp, Eleoc pal, Hotto pal, Scute gal, Carex pse.*

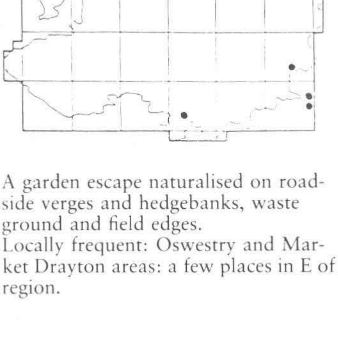


Locally frequent in W half of N Shropshire plain: sparse in NE; Welshpool area; Clun Forest; Lower Severn Valley.

Fool's parsley
'Lady's-laces'
Aethusa cynapium L.

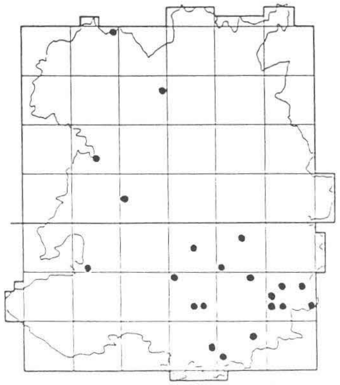
Arable fields, gateways, rubbish tips, waste ground, gardens and banks of rivers on light or loamy soils, dry to damp, PN rich, base med to rich, mod acid to calc, sunny, warm. A pioneer species favoured by disturbance. Ass: (ssp. *agrestis*) *Eupho hel, Fumar off, Matri rec, Rapha rap, Thlas arv.*
ssp. **cynapium** is a tall form which grows on waste ground and the banks of R Severn.
ssp. **agrestis** (Wallr.) Dostál is an arable weed.
Locally frequent throughout region, but mainly lowland and decreasing.

Fennel
***Foeniculum vulgare** Miller



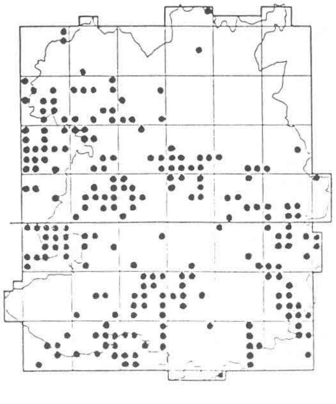
A garden escape naturalised on roadside verges and hedgebanks, waste ground and field edges.
Locally frequent: Oswestry and Market Drayton areas: a few places in E of region.

Pepper-saxifrage
Silaum silaus (L.) Schinz & Thell.



Old species-rich pastures and meadows, railway banks, roadside verges and grassy tracks, on damp to dry soils, PN poor to med, base med, mod acid to neut, sunny, warm. Tolerant of grazing and often compet with shorter grasses but eliminated by ploughing and modern grassland management. Ass: *Dacty fuc, Stach off, Succi pra, Ajuga rep, Primu ver, Leuca vul, Carex fla, Lotus uli, Stell gra.*
Locally frequent in SE quarter of region: rare in N and W.

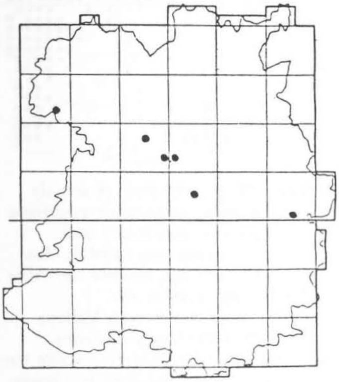
Hemlock
Conium maculatum L.



Bare soil and disturbed ground on roadsides, field margins, rubbish tips and waste ground, on damp to dry soils, PN rich, base rich, mod acid to neut, sunny and warm. A typical member of the tall weed community of disturbed ground esp where manure or fertiliser have been dumped. Ass: *Artem vul, Cardu aca, Cardu nut, Papav rho, Elymu rep, Lamiu alb.*
Frequent at lower altitudes in W, S and SE of region but avoiding high ground: rare in arable NE. Increasing?

False thorow-wax
***Bupleurum subovatum** Link
(*B. lancifolium* auct.)

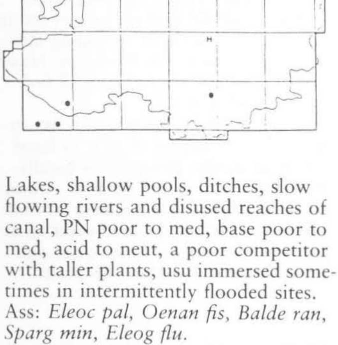
An impersistent casual imported with bird-seed scattered near houses. Formerly confused with the much rarer corn-field weed *B. rotundifolium* L. which has not been recorded in Shropshire.



Fool's water-cress
Apium nodiflorum (L.) Lag.

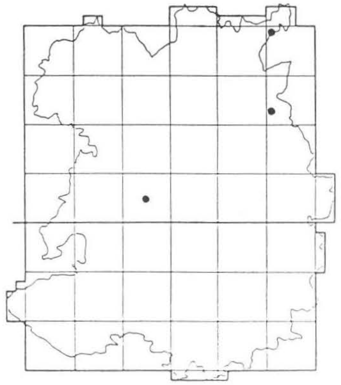
Ditches, sides of canals, ponds, in slow water or on bare mud, PN med to rich, base med to rich, neut to alk, sunny, sheltered, often forming pure stands. Ass: *Myoso sco, Berul ere, Glyce flu, Veron bec, Alism pla, Phala aru, Nastu off.*
Frequent throughout region except at higher altitudes.

Lesser marsh-wort
Apium inundatum (L.) Reichenb. fil.



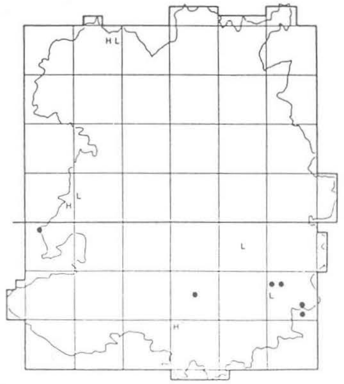
Lakes, shallow pools, ditches, slow flowing rivers and disused reaches of canal, PN poor to med, base poor to med, acid to neut, a poor competitor with taller plants, usu immersed sometimes in intermittently flooded sites. Ass: *Eleoc pal, Oenan fis, Balde ran, Sparg min, Eleog flu.*
Rare: Whitchurch area; Llansantffraid; Halfway House; near Wroxeter; Knighton area. Formerly known from numerous heathy pools and similar localities around Shrewsbury, Shawbury and in the NW, but markedly decreased.

Garden parsley
***Petroselinum crispum** (Miller) A.W. Hill



Occasionally escaped as a casual on roadsides and waste ground but not persisting.

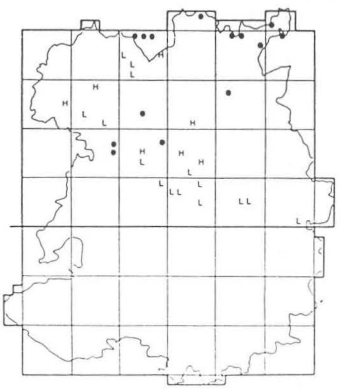
Stone parsley
Sison amomum L.



Grassy banks and hedgerow bottoms, dried out ponds and ditches. Ass: *Arrhe ela, Dacty glo, Centa nig, Toril jap, Chaer tem.*
V. local in SE and SW of region: formerly known also near Ellesmere; and between Marton and Worthen.

Cowbane
Cicuta virosa L.

In tall swampy vegetation at edges of meres and wet alder carr, usu in standing water or on waterlogged peat, PN rich, base rich, alk, sun to ½ shade, sheltered, solitary scattered plants between sedge tussocks or in open reedswamp. Ass: *Phrag aus, Carex pata, Ranun lin, Calam can, Carex ela, Calth pal, Galiu elo.*



V. local on N edge of region and in NW lowland. Formerly much commoner from Oswestry and Ellesmere to Ironbridge. Severe decrease due to habitat loss.

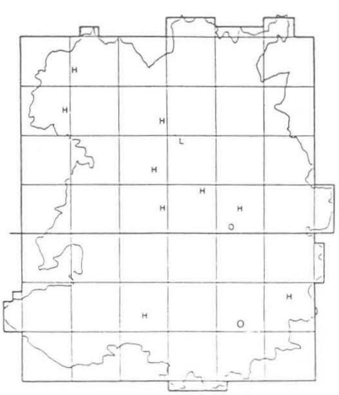
Caraway
***Carum carvi** L.

Reported as a garden escape from several localities in extreme S of region.

Wild angelica
Angelica sylvestris L.

Ditch sides, stream banks, damp dingles, flushed hollows, open scrub and hedgebanks on moist to damp soils with variable water-table, PN med, base med, mod acid to neut, sun to ½ shade, tolerant of mowing but not of heavy grazing, a vigorous competitor. Typical of the tall herb community transitional between rough grassland and woodland. Ass: *Cirsi pal, Achil pta, Filip ulm, Vicia cra, Desch cae, Valer off, Herac sph, Juncu acu.*
Frequent throughout region esp in uplands.

Wild parsnip
†Pastinaca sativa L.

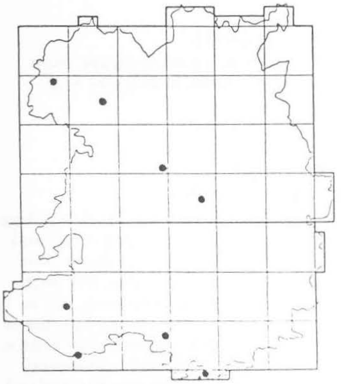


Probably extinct but reported from banks of R Perry: formerly recorded from many localities in NW, Central and SE parts of region. Oreton limeworks (1967 GPR).

Hogweed
'Pig's parsnip'
Heracleum sphondylium L.

Hedgebanks, roadside verges, scrub, open woodland, tall grassland, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to shade, tolerant of mowing but not heavy grazing, a strong competitor. The second to flower of the four common and characteristic roadside umbellifers replacing cow parsley. Ass: *Anthr syl, Arrh ela, Elymu rep, Linar vul, Lathy pra, Geum urb, Glech hed, Pteri aqu, Chaer tem, Toril jap.*
Frequent to abundant throughout region. The narrow-leaved form (var. **angustifolium**) has been recorded in woods in a number of places.

Giant hogweed
***Heracleum mantegazzianum** Somier & Levier



Escaped or established on roadsides, in open woodland, old orchards, scrub and parkland in several localities in W Central parts of region.

Upright hedge-parsley
Torilis japonica (Houtt.) DC.

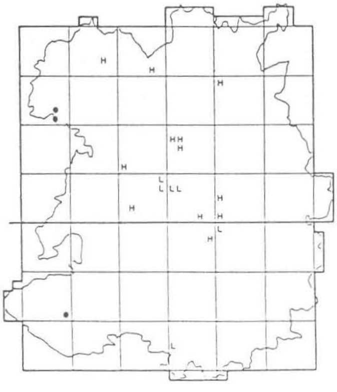
Hedgerows and grassy banks, on dry soils, PN rich, base med to rich, mod acid to neut, sunny, warm, tolerant of mowing but not grazing. The last of the four common and characteristic roadside umbellifers to flower following rough chervil by about three weeks. Ass: *Anthr syl, Chaer tem, Herac sph, Arrhe ela, Elymu rep, Linar vul, Lathy pra.*
Frequent throughout region.

Spreading hedge-parsley
†**Torilis arvensis** (Hudson) Link

Formerly recorded from Astley; Cound; and Gleedon Hill (Brookes specimen in **SHY**). *LFS* says "common".

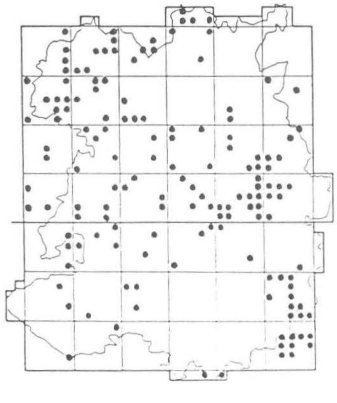
Knotted hedge-parsley
Torilis nodosa (L.) Gaertner

Bare patches on limestone outcrops or on open grassy slopes, on shallow soil, PN poor, base med to rich, mod acid to



calc, sunny, warm, tolerant of grazing but a poor competitor. Ass: *Erodi cic, Valer car, Saxif tri, Aphan arv, Desma rig, Arena ser, Festu ovi.*
V. rare: Llanymynech Hill; Clun Castle Mound. Formerly not uncommon around Shrewsbury and elsewhere in N Shropshire plain and recorded from Ludlow.

Wild carrot
Daucus carota L. ssp. **carota**

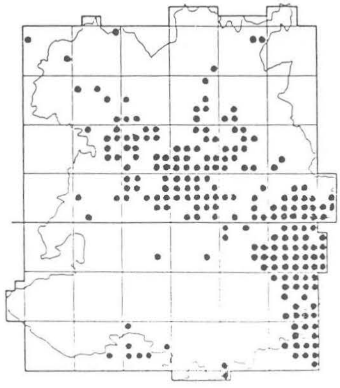


Dry grassland on limestone and waste ground on dry often stony shallow soils, PN med, base rich, neut to calc, sunny, warm, exposed. Tolerant of light grazing or mowing. Ass: *Centa ery, Carex fla, Leuca vul, Linum cat, Briza med, Dacty fuc.*
Frequent in Lower Severn Valley and Oswestry area: locally frequent to sparse in Shropshire plain and Central hills: rare in Clun Forest; Clee Hills area; NE lowland.

MELON FAMILY
CUCURBITACEAE

White bryony
Bryonia dioica Jacq.

Hedgebanks, rubbish tips, woodland edges on dry well drained loams, PN rich, base med, neut, sunny or ½



shaded, warm, sheltered. A strictly lowland species, apparently requiring high summer temperatures and perhaps tolerating low rainfall. Ass: *Sisym off, Toril jap, Bromu ste, Allia pet, Ballo nig, Lamiu alb.*
Frequent in Lower Severn Valley; Bridgnorth area; lowlands from Albrighton to Shrewsbury: locally frequent N to Wem and over to Oswestry: rare elsewhere.

BIRTHWORT FAMILY
ARISTOLOCHIACEAE

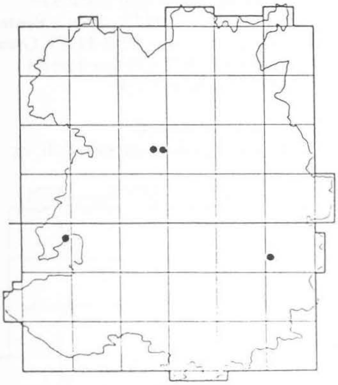
Asarabacca
$***Asarum europaeum** L.
Not in v c 40.
Naturalised on moist stony ground among rhododendrons.
Arley near Bewdley in v c 37, where it had been known for at least 70 years at the time of this latest record (1959 Lady Woodward).

SPURGE FAMILY
EUPHORBIACEAE

Dog's mercury
'Snakeweed'
Mercurialis perennis L.

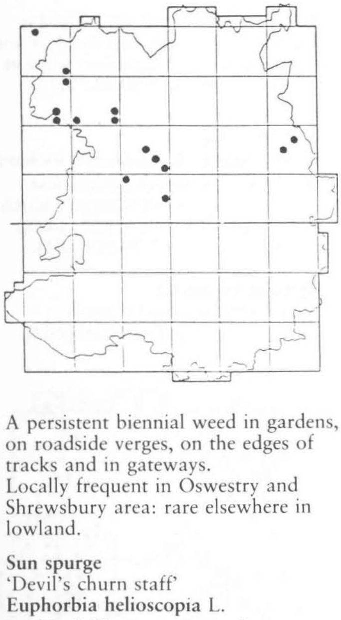
Broad-leaved woodland, scrub, hedges and shady banks, on damp to dry clay or loam soils, PN poor to med, base rich, mod acid to calc, shade to ½ shade, sheltered, intolerant of grazing, disturbance and compet with grasses. An indicator species for long established woodland and old hedges but in this region capable of spreading into new sites as well. Ass: *Sanic eur, Hyaci non, Primu vul, Circa lut, Stell hol, Brach syl, Galiu odo.*
The distribution of dog's mercury in Shropshire is similar to that of hazel and field maple. Frequent to locally abundant throughout the NW, S and SE of region: locally frequent in Central hill country and Clun Forest areas: sparse in the former heathlands and arable farmlands of the NE plain.

Annual mercury
***Mercurialis annua** L.



A weed of flower beds, pavements, building rubble and bases of walls in towns. Rare: Shrewsbury; Bridgnorth; and Priestweston.

Caper spurge
***Euphorbia lathyrus** L.

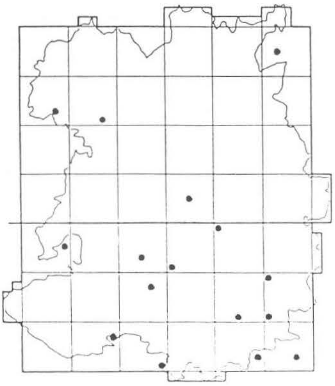


A persistent biennial weed in gardens, on roadside verges, on the edges of tracks and in gateways.
Locally frequent in Oswestry and Shrewsbury area: rare elsewhere in lowland.

Sun spurge
'Devil's churn staff'
Euphorbia helioscopia L.
Arable fields, waste ground, gateways and gardens on dry well drained soils, PN rich, base med to rich, mod acid to calc, sunny, warm, a common field weed esp with root and leaf crops. Ass: *Eupho pep, Aethu cyn, Fumar off, Thlas arv, Viola arv, Poa ann.*
Frequent throughout region esp in lowlands.

Petty spurge
Euphorbia peplus L.
Arable fields, waste ground, gardens, on dry well drained soils, PN rich, base med to rich, mod acid to calc, sunny. A common weed of cultivation. Ass: *Eupho hel, Aethu cyn, Fumar off, Thlas arv, Viola arv, Poa ann.*
Frequent throughout region esp in lowlands.

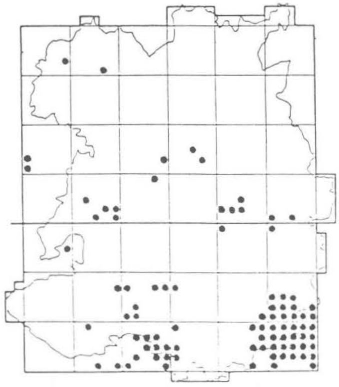
Dwarf spurge
Euphorbia exigua L.



Arable fields and other disturbed ground on dry, light soils, PN med to rich, base rich, neut to calc, sunny, warm. A pioneer annual weed in crops. Ass: *Fumar off, Anaga arv, Papav rho, Shera arv.*
Sparse: mainly on calcareous soils of SE.

Cypress spurge
***Euphorbia cyparissias** L.
Established as an arable weed in Attingham Park: a relic of a former scientific experiment by an officer of the Nature Conservancy Council.

Wood spurge
Euphorbia amygdaloides L.

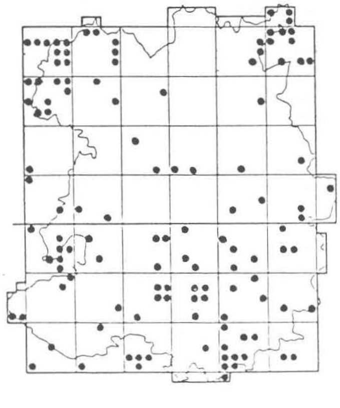


In open woods or woodland edges, rides and clearings and shady hedgebanks on damp to dry clay or loam soils, PN med, base poor to med, mod acid to neut, ½ shade to shade, sheltered and warm. Ass: *Stach off, Lathy mon, Luzul pil, Lonic per, Hyper and.*
Frequent to locally abundant in Lower Severn Valley and Ludlow area: locally frequent elsewhere but mainly in S half of region.

DOCK FAMILY
POLYGONACEAE

Knotgrass
'Pig-grass', 'Pig-rush'
Polygonum aviculare L. agg.
Farmyards, gateways, cattle trampled areas in fields, tracks, waste ground, rubbish tips, garden paths on damp to dry but often winter-wet soils, PN med to rich, base poor to rich, acid to neut, sunny. A vigorous pioneer of bare ground, v. tolerant of trampling and grazing. Ass: *Agros sto, Plant maj, Poa ann, Poa tri, Matri mat, Sagin pro.*
Frequent throughout region.
The sspp. **P. aviculare** and **P. arenastrum** Boreau have both been recorded but have not been consistently mapped.

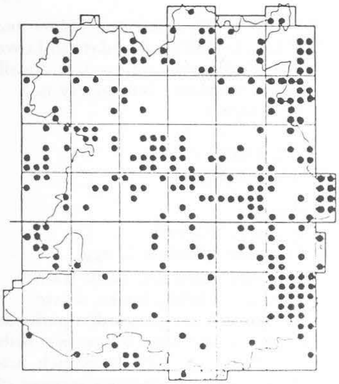
Common bistort
Polygonum bistorta L.



Old species-rich hay meadows, grassland and open scrub on damp loam and clay soils, PN med, base med, mod acid to neut, sun to ½ shade, sheltered. Favoured by annual mowing but not heavy grazing, competes successfully with grasses. Ass: *Festu pra, Trise fla, Stach off, Rumex aosa, Lychn flo, Lotus uli, Ajuga rep.*
Locally frequent in NW, SE and extreme NE of region: occasional elsewhere.

Amphibious bistort
'Lakeweed'
Polygonum amphibium L.

Shallow water usu at the edges of meres, pools, ponds, canals and slow rivers, rooted in mud or silt, PN poor to rich, base poor to rich, mod acid to calc, sun to ½ shade. A truly amphibious plant in that a single patch may extend from the bank (on which it has the upright terrestrial growth form) out from the shore into the water,

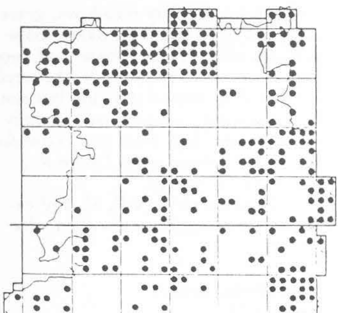


where it adopts the floating-leaved state. The terrestrial form is tolerant of trampling and can form dense pure patches. Ass: Terrestrial – *Lycop eur, Lythr sal, Polyg hyd, Biden cer;* Aquatic – *Nupha lut, Potam nat, Myrio spi, Potam cri.*
Frequent along Severn Valley and tributaries: locally frequent elsewhere in lowland: sparse in hill country.

Redshank, Persicaria
'Arsesmart'
Polygonum persicaria L.

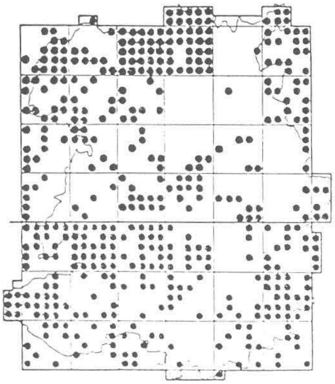
Cultivated and disturbed ground, field edges, verges of newly widened roads, rubbish tips on damp to dry often winter-wet soils, PN med to rich, base poor to rich, acid to calc, sun to ½ shade. Perhaps the most abundant and persistent weed of arable land. Ass: *Sperg arv, Viola arv, Anaga arv, Matri rec, Papav rho, Poa ann.*
Abundant throughout region.

Pale persicaria
Polygonum lapathifolium L.
(incl *P. nodosum* Pers.)



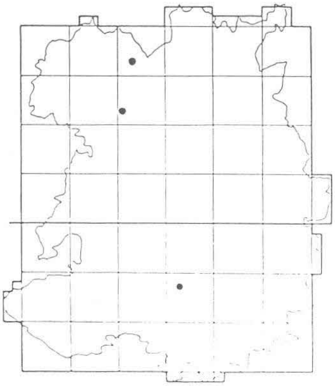
Arable fields, waste ground, exposed edges of ponds esp on damp peat, silt, sand or clay, PN med to rich, base med, mod acid to neut, sunny and exposed. A locally common field weed often growing with *P. persicaria* and sometimes replacing it on peaty or silty soils. Ass: *Gnaph uli, Poten ans, Galeo spe, Capse bur, Cheno alb, Galeo tet, Matri mat, Tripl mar, Veron per.*
Locally frequent throughout region, except W Central hills and Clun Forest.

Water-pepper
Polygonum hydropiper L.



Edges of rivers, ponds, ditches and wet hollows in fields on bare mud or silt in the winter-flood zone, PN med to rich, base med to rich, neut to calc, open, sun to ½ shade. A pioneer weed of wet bare ground but a poor competitor with taller perennials. Ass: *Biden cer, Myoso sco, Ranun sce, Agros sto, Impat gla, Glyce flu.*
Frequent to locally abundant throughout region except in parts of NE.

Tasteless water-pepper
Polygonum mite Schrank

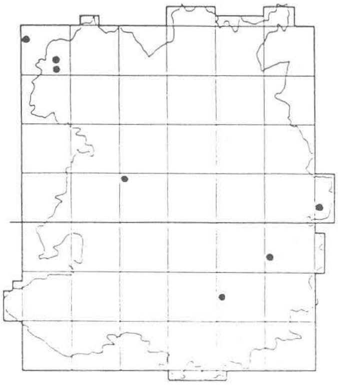


Ditches, wet hollows, cattle-trampled patches in pasture, former middens, on wet to damp soil, PN rich, base med to rich, mod acid to calc, sunny. Rare but probably overlooked: ditch by Cole Mere (1977 EDP); Boreatton (1979 MJI); Broncroft Parks (1979 MSF).

Small water-pepper
$Polygonum minus Hudson

Not in v c 40.
Rare: wet meadow near canal S of Carreghofa (1976 FHP); Pont y Pentre near Llansantffraid (1976 FHP); Great Hem, Forden (ICT); Pentre Heylin (1984 FHP). All in v c 47.

Himalayan knotweed
***Polygonum polystachyum** Wall. ex Meissner

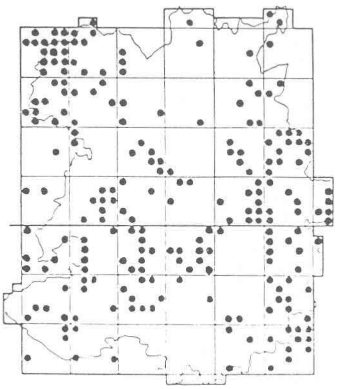


Well established and naturalised in ditches, pond edges, field borders and disused quarries as a garden escape at a number of sites in NW and SE of region.

Lesser knotweed
***Polygonum campanulatum** Hooker f.

Naturalised alongside stream near public footpath from Selattyn Church (1974 E Hardy; 1978 MER); also at Powis Castle, v c 47 (1970+ DHK).

Japanese knotweed
***Reynoutria japonica** Houtt.
(*Polygonum cuspidatum* Siebold & Zucc.)

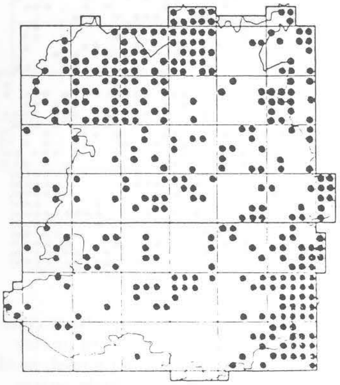


Established often far from gardens on damp scrubby banks, woodland edges and waste land, on clay or loam soils, often alluvial, PN med to rich, base med, mod acid to neut, sun to ½

shade, sheltered and warm. Sometimes cut back by late frosts but tolerant of hard winters. Densely gregarious and with a v. high growth rate, competing successfully with tallest grasses and even tall shrubs.
Locally frequent throughout region except at highest altitudes.

Giant knotweed
***Reynoutria sachalinensis** (F. Schmidt) Nakai
(*Polygonum sachalinense* F. Schmidt)
Small colony well established by lane S of R Severn at Ironbridge (1982 BSBI); big patch in field by Ryton Rd, Beckbury (1982 WEH).

Black-bindweed
Fallopia convolvulus (L.) Á. Löve
(*Polygonum convolvulus* L.)



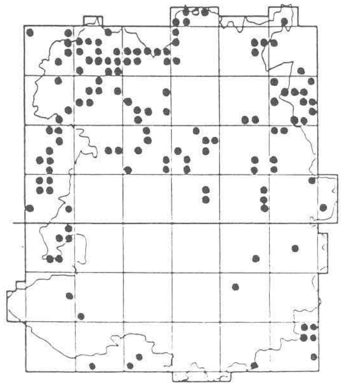
Arable fields, rubbish tips, gardens, on damp to dry soils esp clays, PN rich, base med, neut, sunny and warm. Scrambles over crops and other weeds, persistent and difficult to eradicate. Ass: *Elymu rep, Ranun rep, Aegop pod, Polyg per, Matri rec.*
Frequent in NW and SE of region: locally frequent to sparse elsewhere in lowlands: less common on hills.

Buckwheat
***Fagopyrum esculentum** Moench
Recorded among corn near weir at Combermere (1976 KKB); and from fields near the Lawley (1978 EAA).

Sheep's sorrel
Rumex acetosella L. agg.
Poor grassland, short turf, bare patches on roadsides and rock outcrops, steep hillsides, burnt patches on moorlands, on damp to dry stony, sandy or peaty soils, PN poor, base poor, v. acid to acid, sunny, exposed. A pioneer of disturbed ground on acid impoverished soils persisting but not competing well with tall grasses, tolerant of heavy grazing. Ass: *Festu ovi, Agros cap, Senec syl, Galiu sax, Aira pra, Jasio mon, Hiera pil, Campa rot, Poly pili, Dicr scop.*
Frequent throughout region esp at higher altitudes but avoiding limestone.
Attempts to distinguish and map **R. tenuifolius** (Wallr.) Á. Löve in this region have not been successful because of numerous intermediate states.

Common sorrel
'Sour dock', 'Sour sal'
Rumex acetosa L.
Species-rich meadows, pastures, grassy banks, roadside verges, paddocks, garden lawns on moist to dry soils, PN poor to rich, base poor to rich, acid to calc, sun to ½ shade, tolerant of mowing and fairly heavy grazing. A strong competitor with grasses and a common component of grassland communities on a wide range of soils. Ass: *Centa nig, Achil mil, Ranun acr, Succi pra, Trifo rep, Festu rub, Cynos cri, Phleu pra, Holcu lan.*
Abundant throughout region.

Water dock
Rumex hydrolapathum Hudson

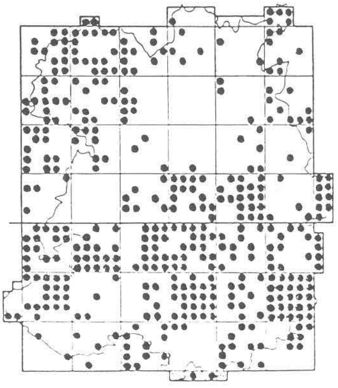


Among tall reeds in shallow water at edges of canals and slow rivers on organic mud or peat, PN rich, base rich, neut to calc, sunny, sheltered. A strong competitor, intolerant of grazing, mowing or intensive management of water courses. Ass: *Glyce max, Sparg ere, Butom umb, Alism pla, Carex amis.*
Frequent in NW esp along canals and other waterways: local in NE and Lower Severn Valley; absent from uplands.

Curled dock
Rumex crispus L.
Cultivated and waste ground, gardens, disturbed roadsides, recently reseeded pastures, on moist to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. A persistent and troublesome weed, difficult to eradicate without intensive treatment. Ass: *Cirsi arv, Rumex obt, Urtic dio, Poa tri, Plant maj.*
Frequent throughout region.

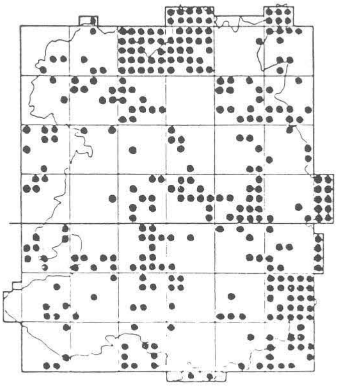
Broad-leaved dock
'Batter dock'
Rumex obtusifolius L.
Hedgebanks and verges, edges of fields, gateways, open scrub, woodland margins and rides, waste ground, ditches, banks of rivers and streams on moist to dry but often seasonally flooded soils, PN rich, base med to rich, mod acid to calc, sun to shade. A vigorous perennial favoured by highly fertile soils and winter flooding, competing strongly with tall grasses but more easily eradicated as a weed than curled dock. Ass: *Urtic dio, Dacty glo, Ranun rep, Phala aru, Elymu rep, Anthr syl, Artem vul, Herac sph.*
Frequent to abundant throughout region.

Wood dock
Rumex sanguineus L.



Woodland glades and rides, open scrub and hedgebanks, often on disturbed ground, on damp to dry clay or loam, PN med to rich, base med to rich, mod acid to calc, ½ shade. A poor competitor with grasses or taller woodland herbs. Ass: *Carex rem, Carex syl, Circa lut, Ajuga rep, Geum urb, Lysim nem.*
Frequent in Central and SE parts of region: locally frequent in NW: sparse in NE lowland and Clun Forest area.

Clustered dock
Rumex conglomeratus Murray

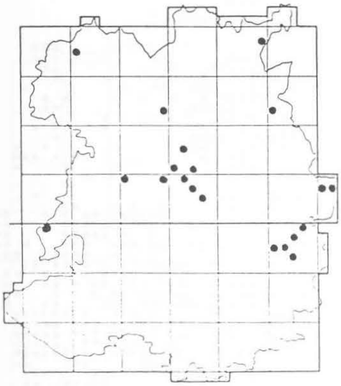


Winter-wet but summer-exposed river and mere shores, pond margins, damp grassy places, canal banks and roadsides on moist to damp soils, PN med to rich, base med to rich, mod acid to calc, sunny. Tolerant of mowing but not heavy grazing and commonest in open pioneer communities. Ass: *Carex hir, Polyg hyd, Agros sto, Biden cer.* Locally frequent throughout region, except at highest altitudes.

Marsh dock
Rumex palustris Sm.

V. rare: Shrawardine Pool (1964 A Newton). Unconfirmed.

Golden dock
Rumex maritimus L.



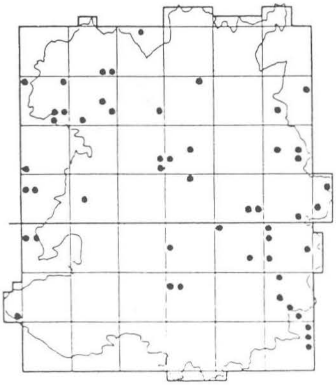
Shallow pools, swamp areas, gravel banks in rivers, wet hollows in grassland, almost always associated with strongly varying water-table and sites where water lies long in winter, on silt, clay or sandy soils, sometimes on peat, PN med to rich, base rich, mod acid to calc, sunny, a pioneer of bare mud. Ass: *Lythr sal, Alism pla, Sparg ere, Juncu inf, Juncu eff, Solan dul, Biden cer, Ranun sce, Polyg amp.* Locally frequent in suitable sites SE of Shrewsbury; in Bridgnorth and Albrighton areas: sparse elsewhere in N Shropshire plain: absent from hill country.

URTICACEAE
NETTLE FAMILY

Pellitory-of-the-wall
Parietaria judaica L.
(*P. diffusa* Mert. & Koch)

Cracks and mortar crevices in stone or brick walls or on building rubble on dry soils, PN med, base rich, calc, warm, sunny, sheltered. Long established as a colonist on some old buildings. Ass: *Cymba mur, Mycel mur, Buddl dav, Asplen rut, Senec squ.* Locally frequent esp in towns and villages in the lowland.

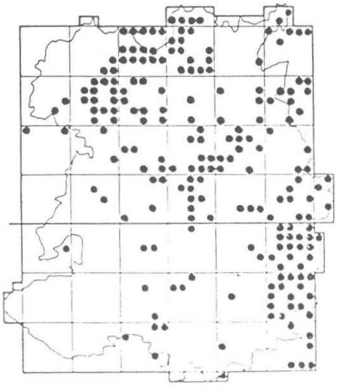
(Map: next column)



Mind-your-own-business
***Soleirolia soleirolii** (Req.) Dandy
(*Helxine soleirolii* Req.)

Locally established on moist stones and rocks in roadside ditches in two places near Market Drayton.

Small nettle
Urtica urens L.



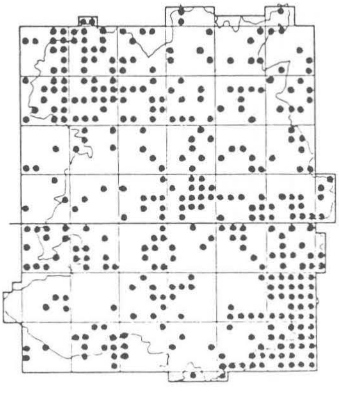
Arable fields, gardens, rubbish tips and waste ground, on damp often poorly drained loam or clay soil, PN rich, base med to rich, mod acid to calc, sunny, warm, sheltered. Ass: *Solan nig, Cheno alb, Senec vul, Stell med, Lamiu pur.* Frequent in N Shropshire plain and Lower Severn Valley: rare in hill country.

Common nettle
Urtica dioica L.

Woods, scrub, hedgebanks, verges, edges of cultivated fields and pastures, waste ground, rubbish tips, farmyards, gardens, on moist or winter-wet to dry soils, PN rich, base poor to rich, mod acid to calc, sun to shade, tolerant of mowing or light grazing and a strong competitor with all but the most vigorous grasses. An indicator of soil rich in phosphate but not necessarily nitrate, persisting long after cultivation has ceased. Grazed when young but avoided when mature by most livestock and thus becoming a troublesome weed in over-grazed paddocks etc. Comparatively easy to eradicate with herbicides or by ploughing, but soon returns. Ass: *Rumex obt, Cirsi arv, Anthr syl, Dacty glo, Herac sph, Galiu apa, Glech hed, Arrhe ela, Arcti min.*
Abundant throughout region in a v. wide range of nutrient-rich habitats.

HEMP FAMILY
CANNABACEAE

Hop
Humulus lupulus L.



In hedgerows as an escape from cultivation on damp to dry loam or clay soils, PN med to rich, base med, mod acid to neut, sun to ½ shade, warm, sheltered. No longer cultivated in the region but often found climbing telegraph poles or their stay-wires. Ass: *Tamus com, Lonic per, Bryon dio, Calys sep.*
Frequent in Oswestry area and Lower Severn Valley: locally frequent elsewhere in lowlands: sparse in uplands and NE plain.

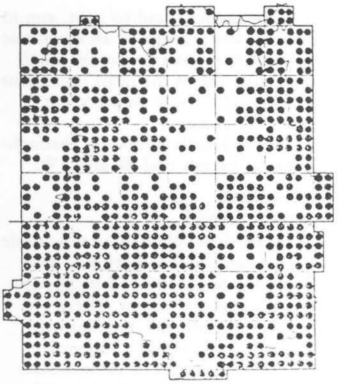
Indian hemp
***Cannabis sativa** L.

Recorded once (1980) from Shelton Rough near Shrewsbury, 4 plants only in a grassy clearing in woodland. Formerly cultivated for its fibre.

ELM FAMILY
ULMACEAE

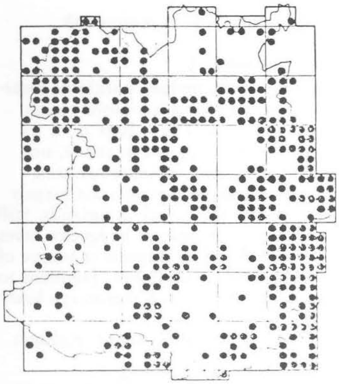
Wych elm
'Witan elm'
Ulmus glabra Hudson

Old species-rich broad-leaved woodlands, scrub and hedgerows, on moist to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to shade, often sheltered in deep dingles. A native woodland tree spreading mainly by seed (unlike the other elms) in this region. Formerly commoner than English elm but v. severely hit by Dutch elm disease even at the young sapling



stage, though it is showing some degree of recovery by vigorous suckering. Ass: *Fraxi exc, Tilia cor, Salix cap, Querc rob, Prunu avi.*
Frequent to abundant throughout region except parts of NE plain.

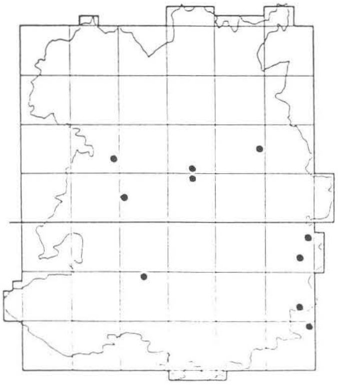
English elm
Ulmus procera Salisb.



Hedgerows, parks and gardens on damp to dry soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. Planted or established by suckers from originally planted stock. Ass: *Querc rob, Fraxi exc, Acer cam, Acer pse.*
Formerly abundant only in SE corner of region though frequent as scattered individuals elsewhere. Severely reduced in early 1970s by Dutch elm disease but one or two old specimens survived after severe attack. Unlike the central Midlands, most Shropshire hedgerows were never conspicuously elm-dominated, oak and ash being much commoner.

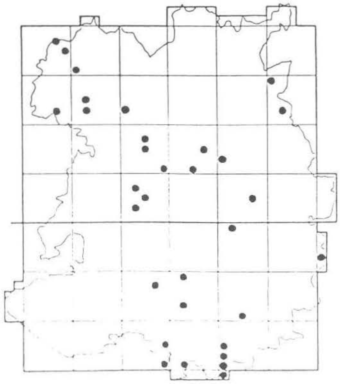
Small-leaved elm
***Ulmus minor** Miller
(*U. carpinifolia* G. Suckow)
(incl *U. plotii* Druce)

Single individual trees reported from scattered localities mainly in S lowland and Lower Severn Valley. Probably always planted and now mostly killed by Dutch elm disease.



WALNUT FAMILY
JUGLANDACEAE

Walnut
***Juglans regia** L.

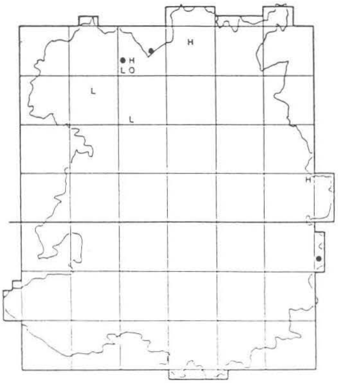


Commonly planted and occasionally naturalised in old gardens, orchards and roadside verges, germinating successfully from self-sown seed and occasionally growing to maturity. Sparse to locally frequent mainly on rich soils in lowlands.

BOG MYRTLE FAMILY
MYRICACEAE

Bog myrtle
Myrica gale L.

Lowland peat bogs or wet heath on moist to damp peat, PN poor, base med to poor, v. acid to acid, sun to ½ shade, sheltered. Characteristic of the transition zone between the acid crown of a raised bog and the more base rich surrounding fen. Ass: *Molin cae, Narth oss, Poten pal, Erica tet, Osmun reg, Plata bif, Salix cin, Luzul mul, Alnus glu.*
V. rare: Wem Moss; Blake Mere wood; stream between Claverley and Aston. Formerly more widespread in



NW of region: severe decrease, endangered.

BIRCH FAMILY
BETULACEAE

Silver birch
Betula pendula Roth
(*B. verrucosa* Ehrh.)
Open woodland, scrub, hillsides, moorland, abandoned pasture, waste land, quarries, on dry to damp often sandy or stony soils, PN poor to med, base poor to rich, v. acid to calc, sun to ½ shade, often exposed. A pioneer tree colonising former grazing land and other habitats where dry and relatively infertile soils retard the growth of other trees. Intolerant of heavy shade but persisting long in woodland and plantations. Regarded as a weed by foresters because the tops of birches tend to whip and damage neighbouring conifers. Ass: *Querc pet, Sorbu auc, Ulex eur, Cytis sco, Pteri aqu, Crata mon, Acer pse.*
Frequent to abundant throughout region esp in neglected parts of upland. V. variable genetically in weeping habit, whiteness of bark and other characters.

Downy birch
Betula pubescens Ehrh. ssp. **pubescens**
Damp open woodlands, moorlands, peat bogs, scrubby dingles, on moist to damp often peaty soils, PN poor to med, base poor to med, v. acid to neut, sun to ½ shade, playing the same pioneer role on damp infertile soils as silver birch does on drier sites. Where the two species grow together in suitable mixed habitats e.g. at Brown Moss, intermediates also occur which may be of hybrid origin. Ass: *Sorbu auc, Pinus syl, Salix cin, Salix aur, Alnus glu, Frang aln, Ulex gal.*
Frequent to abundant in suitable habitats throughout region.

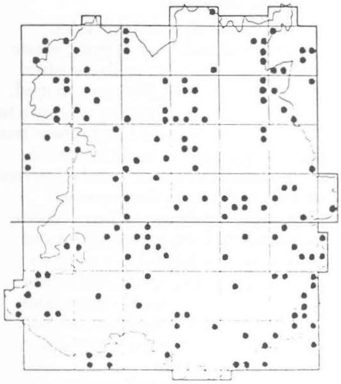
Alder
'Waller'
Alnus glutinosa (L.) Gaertner
Banks of streams and rivers, ditches, meres, ponds, damp woodland and hedges, on wet to damp often winter-

flooded clay, loam or peaty soils, PN rich, base poor to rich, acid to calc, sun to shade, usu sheltered. The dominant tree on poorly drained but reasonably fertile soils, itself contributing to their fertility by means of the bacteria in its nodular roots. Ass: *Salix fra, Salix vim, Salix cin, Querc rob, Ulmus gla, Fraxi exc, Prunu pad.*
Formerly harvested for making clogs.
Frequent to abundant throughout region.

Grey alder
***Alnus incana** (L.) Moench
Originally planted but long naturalised, spreading by suckers and by seed on bank of the R Severn at Preston Montford, where it appears to hybridise with common alder.

HAZEL FAMILY
CORYLACEAE

Hornbeam
***Carpinus betulus** L.

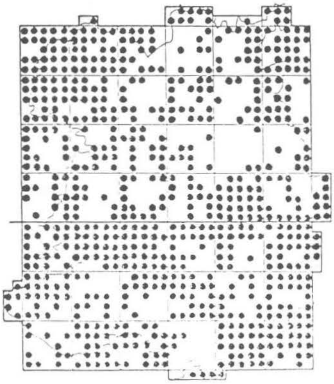


Scattered trees in hedges, parkland, gardens, coverts and occasionally in old broad-leaved woodland, on damp to dry soils, PN med to rich, base med to rich, mod acid to neut, sun to shade, warm, sheltered. Probably outside its range as a native tree in this region, but fine individual specimens occur, and it has been recorded from surviving blocks of ancient woodland.
Locally frequent throughout region, mainly lowland.

Hazel
Corylus avellana L.
Open woodland, scrub, hedges, old quarries, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Typically an understorey shrub in open woodlands, esp ash woods, although management of hazel as coppice with standard oaks was not widely practised in this region. Also a common hedgerow shrub, together with field maple and dog's mercury marking the former areas of woodland and so almost absent from NE lowland. Ass: *Crata mon, Cornu san, Fraxi exc, Ulmus gla, Acer cam, Vibur opu.*
Locally frequent to abundant throughout region except NE.

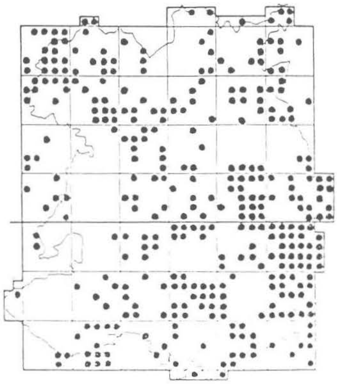
BEECH FAMILY
FAGACEAE

Beech
***Fagus sylvatica** L.



Parks, old gardens, plantations, shelter belts, hedges, on damp to dry often shallow sandy or stony soils, sometimes on limestone, PN poor to rich, base poor to rich, acid to calc, sun to shade, probably outside its range as a native tree in this region but v. widely planted for ornamental and economic use, withstanding the rigours of exposure even at quite high altitudes. Beech hedges are not a feature of this region but individual trees or rows of trees are locally conspicuous. Varieties such as copper beech and cut-leaved beech are frequently planted. The former hybridises freely with the common beech. Ass: *Acer pse, Fraxi exc, Querc rob, Ulmus gla, Aescu hip.*
Frequent throughout region.

Sweet chestnut
***Castanea sativa** Miller



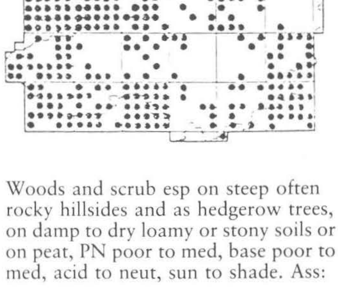
Plantations, woods, hedges, parkland, on moist to dry soils, PN poor to rich, base poor to rich, acid to neut, sun to shade. Widely planted as an economic crop for fence posts and other small timber, still one of the most important broad-leaved trees in forestry but scarcely naturalised.
Frequent to locally abundant throughout region except mid W and SW.

Turkey oak
***Quercus cerris** L.
Quite extensively planted as a roadside hedgerow tree and in parkland and plantations. Scattered and locally frequent throughout region. There are some fine Turkey oak avenues e.g. between Kempton and Clunbury. Occasional seedlings of intermediate character suggests that Turkey oak hybridises with the native species.

Evergreen oak, holm oak
***Quercus ilex** L.
Occasionally planted, a few fine old specimens surviving in sheltered situations in towns and parkland. Not fully hardy in the region but survived the severe winter of 1981–82, although all the leaves were shed by exposed trees.

Pedunculate oak, common oak
'Wuk'
Quercus robur L.
Woods, scrub, hedges, parkland, quarries, waste ground, on moist to dry soils, PN med to rich, base poor to rich, acid to calc, sun to shade, undoubtedly native in some lowland woods esp on heavy soils but largely replaced by sessile oak in uplands. Still one of the commonest hedgerow trees in lowland and an important source of quality hardwood timber. Frequent to abundant throughout region esp lowland.
Genetically variable (see *Q. petraea*).

Sessile oak, durmast oak
Quercus petraea (Mattuschka) Liebl.

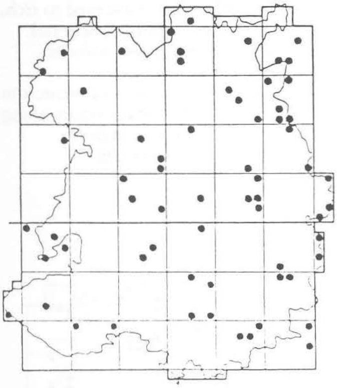


Woods and scrub esp on steep often rocky hillsides and as hedgerow trees, on damp to dry loamy or stony soils or on peat, PN poor to med, base poor to med, acid to neut, sun to shade. Ass:

Sorbu auc, Fraxi exc, Querc rob, Betul pen, Ilex aqu.
Wyre Forest is one of the largest areas of sessile oak woodland in the country. Many of the sessile oakwoods of the region were formerly managed as rotational coppice not only for small timber but also for cleft laths for making baskets (wiskets), for charcoal and for tan-bark. Former area of coppice remain as 'scrub' oakwoods with multiple stems from a single stock. Some woods of sessile oak (e.g. The Ercall) show great genetic variability. Trees intermediate in certain characteristics between *Q. petraea* and *Q. robur* are common in the region and are probably of hybrid origin.

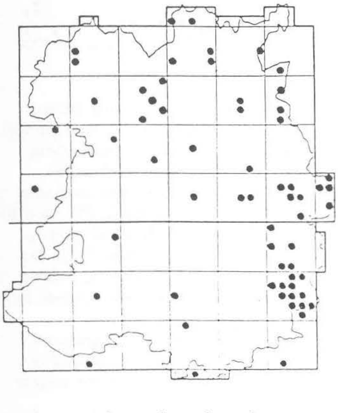
WILLOW FAMILY
SALICACEAE

White poplar
***Populus alba** L.



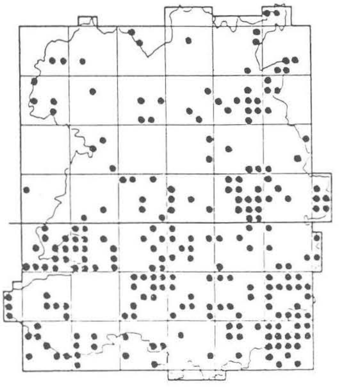
Hedgerows, parks and gardens, planted and spreading v. freely by suckers. Sparse to locally frequent throughout region.

Grey poplar
***Populus canescens** (Aiton) Sm.
(*P. alba* × *tremula*?)



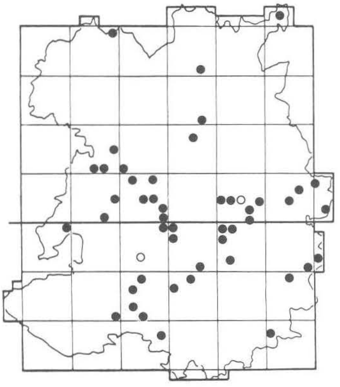
Hedges, parks and gardens, less common than *P. alba* and always planted. Locally frequent in parts of plain and Lower Severn Valley: rare in uplands.

Aspen
Populus tremula L.



Edges and rides of old deciduous woodlands and in hedges or forming small aspen groves, on moist to damp soils, PN poor to med, base poor to rich, mod acid to neut, sun to ½ shade, generally sparse but gregarious when it does occur, spreading freely by suckers. Most typical in open secondary birch-dominated woodland on poor soils. Ass: *Betul pen, Betul pub, Sorbu auc, Salix cap, Querc pet, Ilex aqu.* Frequent in Wyre Forest area: locally frequent in hill country and parts of E lowland.

Black poplar, Manchester poplar
Populus nigra L.

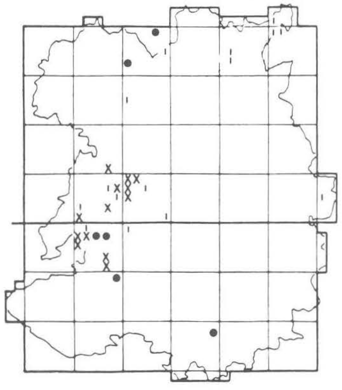


● Present during survey
○ Pre-1973 record

Hedgerows, pond margins, or as isolated trees on moist to mod dry soils, PN rich, base med to rich, mod acid to neut, sun to ½ shade, warm, sheltered. Ass: *Alnus glu, Fraxi exc, Querc rob, Salix fra.*
Apparently native in flood-plain of R Severn and tributaries, where it often occurs as isolated trees, the relicts of former woodland. Also occasionally planted in hedges from local native stock. Confined to lowlands below 800 ft (244m) but scarce in the N plain. The records are derived from a BSBI survey and all are confirmed by E Milne-Redhead.
The 'flag tree' at Aston-on-Clun is the best known specimen of this species in our region. It is at least 275 years old, and is decorated with flags of many nations on Arbor Day, 29 May, each year.
P. nigra 'Italica', the Lombardy poplar, has been planted, often in rows, in hedges and parkland.
Hybrids between *P. nigra* and various forms of the American ***P. deltoides** s.l. are very commonly planted for quick growth in damp sites, field corners, shelter-belts, etc. **P. × canadensis** Moench 'Serotina' (Black Italian poplar) and 'Regenerata' (Railway poplar) are the most widely used.

Balsam poplar
***Populus trichocarpa** Torrey & Gray
This and other species or hybrids of balsam poplar are quite frequently planted and spread readily by suckers, causing great inconvenience by entering and breaking drains and sewage pipes. Not really naturalised in this region.

Bay willow
Salix pentandra L.



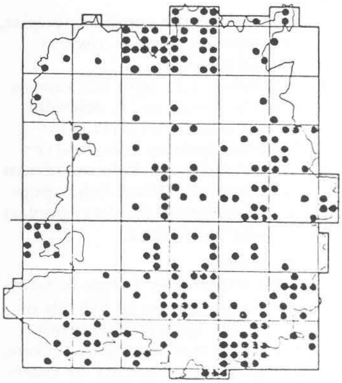
● *S. pentandra* det CAS
X *S.* × *meyerana* det CAS
I unconfirmed

Stream banks, scrub, hedgerows and marshy hollows on wet to damp soils, PN poor to med, base poor to med, mod acid to acid, sun to ½ shade. Ass: *Salix cin, Salix aur, Betul pub, Sorbu auc, Prunu pad.*
The status of the bay willow in this region is obscure: even the populations safely attributed to the true species seem to be mainly or entirely female, although on sites where they form extensive scrub on boggy ground the trees appear native. Mainly concen-

trated in W Central hills, outlying localities in N plain where it is most certainly planted.

The map includes records for the hybrid *S. fragilis* × *pentandra* (**S. × meyerana** Rostk. ex Willd.) which is locally frequent esp in the Pontesbury area and on Hyssington Marsh. First found by Leighton at Hanwood in 1836 (see 2.8).

White willow
Salix alba L.



Well established by rivers and in coppices or hedges on wet to moist soils with variable water-table, PN rich, base med to rich, mod acid to neut, sunny, sheltered. Ass: *Alnus glu, Fraxi exc, Salix fra, Salix vim.*

Usu planted and more or less confined to lowlands esp in S of region. The typical form seems to be all or mostly female.

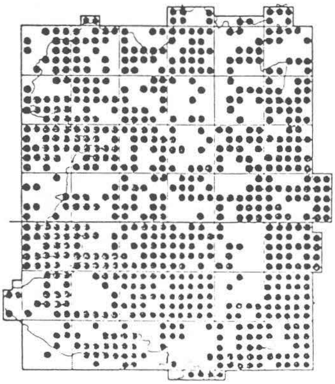
The planted varieties include **caerulea** (the cricket-bat willow), **vitellina** (golden willow) as well as hybrids with *fragilis* and with *babylonica* (qv). The white willow – crack willow hybrids are variable and v. difficult to name; one attractive cultivar fairly common in Shrewsbury and the area to the NW, male and with orange-brown twigs, is probably 'Sanguinea'. A popular variety in modern plantings is the scarlet willow, *S. alba* 'Chermesina' ('Britzensis').

Weeping willow
***Salix babylonica** L.

True *S. babylonica* is v. rare and doubtfully hardy in Britain. The most commonly planted weeping willow today is the hybrid with the golden willow, **S. × chrysocoma** Dode (*alba vitellina* × *babylonica*). It is not truly naturalised.

Crack willow
Salix fragilis L.

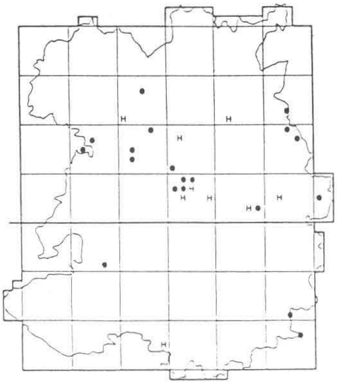
Growing singly or in groups by rivers, streams, ditches, pools, and in hedges, or as more or less pure stands in damp woodlands which may be relics of former withy beds, on wet to damp often winter-flooded clay soils or alluvium, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Alnus glu, Fraxi exc, Salix alb, Salix vim.*



Regularly pollarded in the past, as can be seen by the short thick trunks often hollow or with soil-filled crevices in which grows a distinctive epiphytic flora. Crack willow propagates freely by selfstruck cuttings carried down river in flood.

Most of the local material examined is female and belongs to the clonal var. **russelliana** which is frequent throughout region. Other varieties recorded include **decipiens** and **furcata**; for hybrid with *S. pentandra* see the latter.

Almond willow
Salix triandra L.

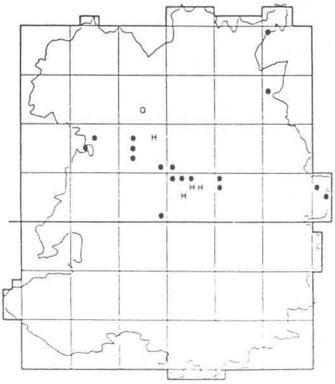


Riverbanks, old osier beds and hedges, on wet to damp often winter-flooded soils, PN rich, base med to rich, mod acid to calc, sunny, sheltered. Ass: *Salix vim, Salix cin, Salix pur, alnus glu, Phala aru.*

Formerly grown as an osier of great value for fine basket work, but both sexes are well established esp along R Severn and may well be native.

The hybrid with *S. viminalis* (**S × mollissima** Hoffm. ex Elwert nm **undulata**) was formerly known as a single specimen near Meole Brace bridge and was recorded from Attingham Park by R Severn in 1976 (FHP).

Purple willow
Salix purpurea L.

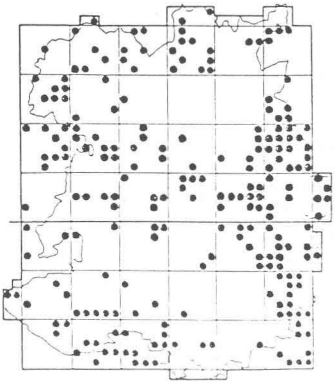


Riverbanks, old osier beds and hedges, on wet to damp often winter-flooded soils, PN med to rich, base med to rich, mod acid to neut, sunny, sheltered. Ass: *Salix vim, Salix cin, Salix tri, Alnus glu, Phala aru.*

Purple osier is by no means common in this region but both sexes occur along R Severn and it may be native.

For hybrids see *S. viminalis.*

Osier
Salix viminalis L.



By rivers, more rarely along minor streams and ditches, sometimes surviving in old osier beds but spreading quite freely by seed as well as by suckers or cuttings, on wet to damp often flooded alluvial soils, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered. Ass: *Salix fra, Salix cin, Salix tri, Fraxi exc, Alnus glu, Sambu nig, Artem vul, Tanac vul, Phala aru.*

Male and female equally common; native and genetically variable. Formerly a v. important crop for coarse basket work.

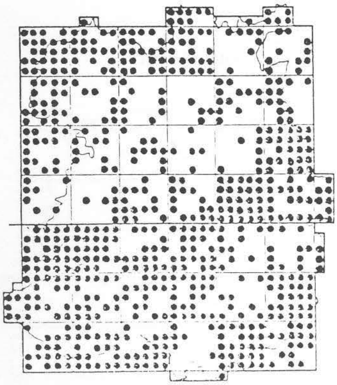
Frequent along both major and minor

rivers and in most parts of lowland: sparse in NE lowland, W Central hills and Clee Hills.

The hybrids with *S. caprea* and *S. cinerea* are locally frequent, both cultivated and spontaneous. The former (**S. × sericans** Tausch ex A. Kerner) is mainly a lowland plant, the latter (**S. × smithiana** Willd.) mostly in the hills. Records in *LFS* for **S. ×** stipularis Sm. probably refer to large-stipuled forms of *S. × sericans,* still found to the E and N of Shrewsbury.

The hybrid with *S. purpurea* (**S. × rubra** Huds.) has been recorded from Ellesmere. The interesting putative triple hybrid *S. cinerea × purpurea × viminalis* (**S. × forbyana** Sm. the fine basket osier) grows by the Meole Brook on Shrewsbury golf course; and beside Mere Pool, Shrewsbury.

Goat willow, Great sallow, Pussy willow, Palm
'Black Sally'
Salix caprea L.



Old deciduous woodland, scrub, hedges, waste ground, mining spoil, limestone quarries, sand pits, railway sidings and embankments, on damp to dry usu well-drained soils, PN med, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Prunu avi, Coryl ave, Betul pen, Salix cin, Acer cam, Vibur opu, Crata mon, Fraxi exc.*

A pioneer shrub of clearings on base rich soils and esp of ground disturbed in previous years by human activity such as road constuction and mining. Tolerates drier conditions than most *Salix* species, and, unlike most, propagates almost exclusively by seed; hardwood cuttings are difficult to strike, but some of its hybrids do not suffer from this drawback. Source of artists' best quality charcoal. See. *S. aurita, S. cinerea* and *S. viminalis* for hybrids.

Frequent to abundant throughout region except at highest altitudes.

Grey willow, Common sallow
'Sally'
Salix cinerea L. ssp. **oleifolia** Macreight
(*S. atrocinerea* Brot.)

Damp scrub and woodland, moorland, fen, peat bogs, marshy hollows, edges of ponds, streams or rivers, hedges, waste ground, quarry floors, on wet to damp often winter-wet soils with impeded drainage, PN poor to med, base poor to rich, acid to calc, sun to ½ shade. Ass: *Alnus glu, Betul pub, Salix cap, Salix vim, Crata mon.*

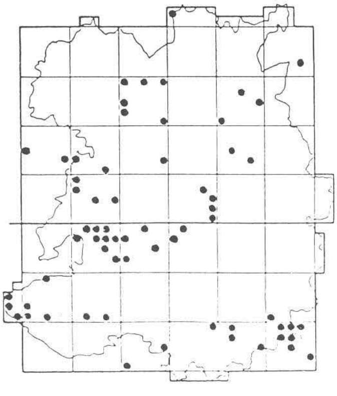
The commonest *Salix* species in the region both in long established communities and as a pioneer of recently disturbed ground. Extremely variable in habit, hairiness, leaf-shape and other characteristics, both sexes being equally common.

Frequent to abundant in suitable habitats throughout region.

Hybrid plants with densely grey-hairy young shoots approaching ssp. **cinerea** are occasionally found.

Hybrids with *S. caprea* (**S. × reichardtii** A. Kerner) are less common than is often thought, though hybrid swarms do occur where the parent species grow together in open communities with plenty of space for seedling establishment.

Eared willow, Eared sallow
Salix aurita L.



Moorland and upland ditches, damp scrub, open woods, hedges, on wet to damp often water-logged peat or clay soils, PN poor, base poor to rich, acid to neut, sun to ½ shade, often exposed. A poor competitor with taller shrubs but quite tolerant of grazing. Typically a plant of infertile poorly drained soils in uplands. Ass: *Salix cin, Rosa mol, Rosa arv, Betul pub, Ilex aqu, Lonic per, Prunu pad.*

Locally frequent in W Shropshire hills and Wyre Forest area, sparse elsewhere esp in lowland and limestone outcrops.

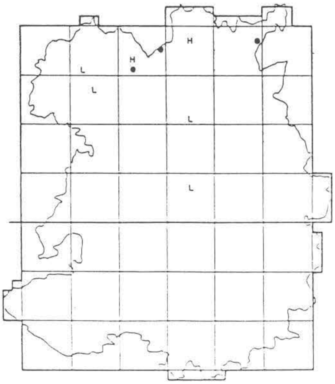
Hybridises freely with *S. cinerea,* the hybrid (**S. × multinervis** Doell.) being commoner in some areas of the lowlands than *aurita* itself.

The rare hybrid with *S. caprea (***S. × capreola** A. Kerner ex Anderss.) has been recorded once from Coldyeld near Bridges.

Dark-leaved willow
Salix nigricans Sm.

A single female tree recently discovered on Merrington Green (1982 CAS) with every appearance of being wild. Previously recorded once, more than a century ago, on Shawbury Heath. A northern species well outside its usual range here.

Creeping willow
Salix repens L.



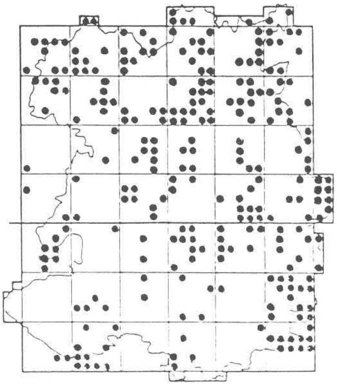
Peat bog and fen, on moist to damp peat, PN poor, base poor to med, acid to mod acid, sunny, sheltered. Ass: Fen – *Juncu sub, Carex pcea, Epipa pal;* Bog – *Narth oss, Erica tet, Eriop ang.*

V. rare, the total population in the region reduced to a few plants at E end of Crose Mere; Whixall Moss; and Betton Moss.

Formerly known from several other peat bogs in Shropshire plain: severe decrease due to habitat loss: endangered.

HEATH FAMILY
ERICACEAE

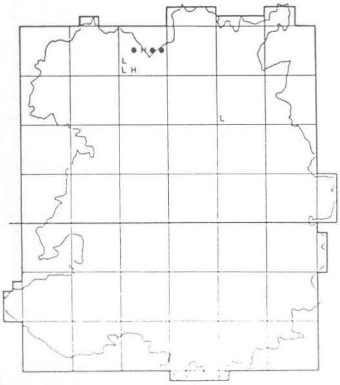
Rhododendron
***Rhododendron ponticum** L.



Once commonly planted in amenity

woodland and game coverts where it is now firmly established and spreads to form dense thickets in which little else can live. Esp abundant in dry woods on sandstone hills but also occurs in damper peaty places, moist to dry peat or sandy soils, PN poor, base poor, v. acid to mod acid. Highly gregarious and tolerating heavy shade. Ass: *Acer pse, Fagus syl, Betul pen, Sorbu auc.*
Locally frequent throughout region esp N and E but avoiding limestone.

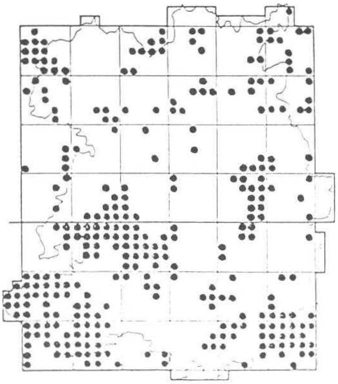
Bog rosemary
Andromeda polifolia L.



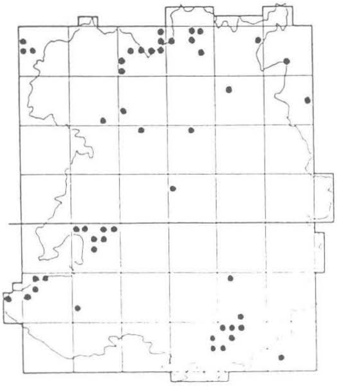
Edges of cuttings and other relatively well drained parts of lowland peat bogs, also spreading into *Sphagnum* patches, on wet to damp water-logged peat, PN poor, base poor, v. acid to acid, sunny, sheltered. Flowers most freely after burning, regenerating from underground rhizome. Ass: *Erica tet, Drose rot, Rhync alb, Vacci oxy, Eriop ang, Spha papi.*
Rare: Whixall Moss; Wem Moss; Clarepool Moss.
Formerly on several other peat bogs in Ellesmere area and NE Shropshire but much reduced by habitat loss.
A common fungal parasite (*Exobasidium vaccinii* Woron.) produces strikingly modified shoots with broad leaves the colour and texture of purple cabbage.

Heather
'Ling', 'Grig'
Calluna vulgaris (L.) Hull

Moorland, peat bogs, heath, old grassland, scrub, open woodland, on damp to dry soils often peaty or with thick raw humus, PN poor, base poor to med, v. acid to acid, sun to ½ shade, exposed. Tolerant of a wide range of conditions including heavy grazing but avoiding extremes of wetness and drought and high lime content. Will survive occasional ploughing or burning. Managed in uplands by repeated burning or cutting at intervals of 10–15 yrs to promote growth of young shoots for grouse. Commoner than bilberry in lowland sites. Ass: *Vacci myr, Erica cin, Desch fle, Erica tet, Eriop ang, Pteri aqu, Nardu str, Ulex gal.*
Frequent to locally abundant in Central hills; Clun Forest; Wyre Forest area; Clee hills; and Oswestry uplands: locally frequent to sparse elsewhere, avoiding limestone.



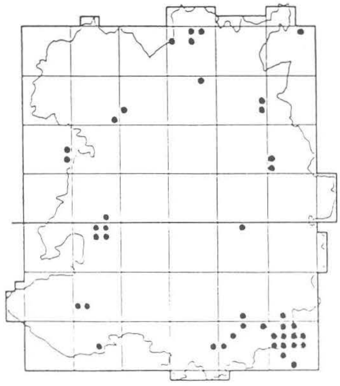
Cross-leaved heather
Erica tetralix L.



Peat bogs, moorland and wet heath, on moist to damp usu peaty soils, PN poor, base poor, v. acid to mod acid, sunny, exposed, cool, tolerant of light grazing and typically a plant of water-logged sites. Ass: *Callu vul, Vacci oxy, Narth oss, Eriop ang, Poten ere, Juncu squ, Spha papi, Spha rube.*
Locally frequent in Ellesmere – Whitchurch area; Stapeley Hill – Stiperstones area; Clee hills and Catherton Common: sparse elsewhere.

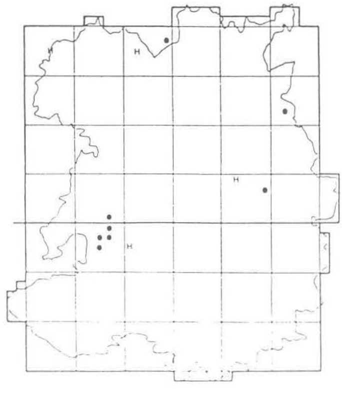
Bell heather
Erica cinerea L.

Dry heath or moorland and rocky slopes, on shallow dry stony or sandy soils, with thin raw humus, PN poor, base poor, v. acid to acid, sunny, warm, exposed, tolerant of light grazing. Commonly in upland but with v. marked microclimatic preference for S facing slopes. Ass: *Callu vul, Ulex gal, Rumex alla, Agros vin, Cytis sco.*



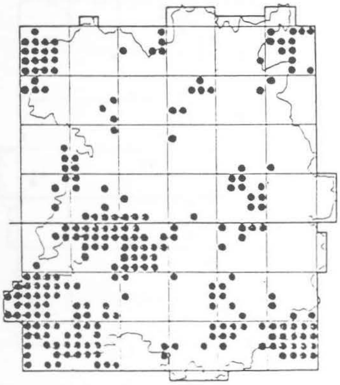
Locally frequent in Stiperstones area; Catherton Common; Wyre Forest area: v. sparse elsewhere.
On Craig Breidden this species is a member of a remarkable mixed community of calcifuge and calcicole plants growing on shallow soils over doleritic rock outcrops.

Cowberry
'Cranberry'
Vaccinium vitis-idaea L.



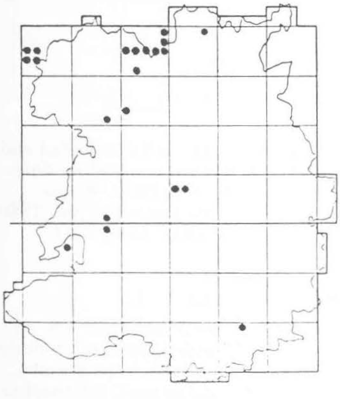
Dry upland heath and quartzite blockfield, lowland peat bogs, on dry acid peat or raw humus among stones, PN poor, base poor, v. acid, stony, exposed. Ass: *Vacci myr, Callu vul, Desch fle, Melam pra, Nardu str, Poly pili.*
Very locally frequent to abundant on the Stiperstones NNR: also recorded as single small colonies on Fenn's Moss, near Whitchurch; Puleston Bog, near Chetwynd; and on a colliery pit mound at Holywell, in Telford Town Park. Cranberry Rock is named after this species.
The hybrid with *V. myrtillus* (**V.** × **intermedium** Ruthe.) has been seen (3 separate plants) on the ridge path and near the Manstone Rock on the Stiperstones (1970 CAS).

Bilberry
'Wimberry'
Vaccinium myrtillus L.



Moorland and heath, open woods and shady banks, on damp to dry sandy or stony soils or among rocks usu rooted in peat or in thick raw humus, PN poor, base poor, v. acid to acid, sun to shade, tolerant of grazing but not heavy trampling. Ass: *Callu vul, Vacci vit, Empet nig, Erica cin, Poten ere.*
In lowland parts of the region bilberry behaves as a shade plant being more or less restricted to woodlands and N facing slopes: on higher hills in the uplands it comes into the open and is conspicuously commoner in N or NW facing slopes (eg Caer Caradoc; Earls Hill; Long Mynd and Stiperstones 'Batches'). In such open sites the plant can produce large crops of fruit which is still regularly picked in August.
Locally frequent to abundant in Oswestry uplands; W Central hills; Clun Forest; Clee Hills; Wyre Forest; and Telford area: sparse elsewhere.

Cranberry
Vaccinium oxycoccos L.
(*Oxycoccus palustris* Pers.)



Peat bogs, usu growing among *Sphagnum*, on wet to moist peat, PN poor, base poor, v. acid to acid, sun to ½ shade. More or less restricted to this special habitat but often in dense scrambling mats covering quite large areas where conditions are favourable: intolerant of drainage. Ass: *Erica tet, Drose rot, Eriop ang, Andro pol, Spha papi, Spha rube.*
Very locally frequent in Ellesmere–Whitchurch area; Oswestry uplands: rare elsewhere. The large population of cranberry on Whixall Moss shows interesting genetic variation in the shape (oval or spherical) and colour of the fruit: some plants have fruit which ripen to a uniform scarlet colour, others are attractively speckled with crimson or maroon dots. Variation in these two characteristics appears to be independent and no named varieties are recognised.

American cranberry
†*Vaccinium macrocarpon Aiton
A single plant once recorded (1968 CAS) among *Molinia* and *Sphagnum recurvum* under birch on Calcott Moss near Bicton. Site subsequently flooded: probably bird-sown.

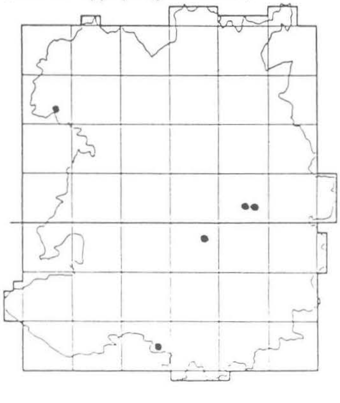
WINTERGREEN FAMILY
PYROLACEAE

Common wintergreen
Pyrola minor L.
Reported several times from Whitcliff Wood and other parts of Mortimer Forest, the latest being a roadside locality SO 495742 (1971 SRT), also seen in Knowle Wood near Hope Bagot by LW Poel in the late 1950s, and Stanton Lacy (*RBF* 1925).

Intermediate wintergreen
†Pyrola media Swartz
Extinct.
Whitcliff Coppice (1842 and 1889 in **HMS**); and near Stanton Lacy.

BIRD'S-NEST FAMILY
MONOTROPACEAE

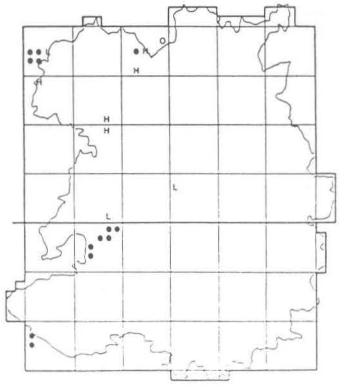
Yellow bird's-nest
Monotropa hypopitys L.
(incl *M. hypophegea* Wallr.)



Under trees or scrub on shallow limestone soils. V. rare, only seen recently on Benthall Edge; in Lilleshall Quarry on Wenlock Edge (1976 KMS); Blodwel Wood (1962 CAS).

CROWBERRY FAMILY
EMPETRACEAE

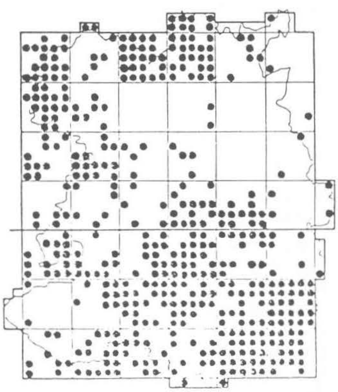
Crowberry
Empetrum nigrum L. ssp. **nigrum**



Upland heath and lowland peat bogs, on damp to dry peat, PN poor, v. acid, sunny and exposed (upland) to tree-shaded (lowland). Ass: *Vacci myr, Vacci vit, Callu vul, Desch fle, Melam pra.*
Very locally frequent on Stiperstones NNR; around Llechrydau on Oswestry uplands; on the Beacon Hills near Knighton: rare on Clarepool Moss and Whixall Moss: formerly known from several other peat bogs in Shropshire plain.

PRIMROSE FAMILY
PRIMULACEAE

Cowslip
'Cowerslop', 'Cowanlop'
Primula veris L.

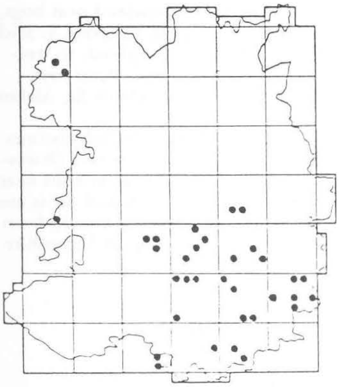


Species-rich grassland, banks, tall herb and open scrub or woodland esp on limestone and recently limed pastures,

on damp to dry shallow soils, PN poor to med, base med to rich, neut to calc, sun to ½ shade, tolerant of grazing. A fairly good colonist of bare patches such as those caused by trampling, also favoured by liming of old infertile pastures. Ass: *Ranun acr, Ranun bul, Lotus cor, Antho odo, Cynos cri, Conop maj, Orchi mas, Sangu min.*
Frequent throughout most of region except Clun Forest; W Central hills; and E parts of N Shropshire plain.

Primrose
'Pimmy rose'
Primula vulgaris Hudson

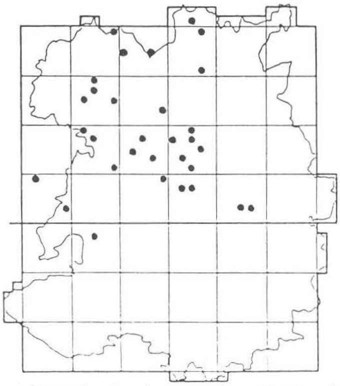
Open woodland, scrub, grassy banks, edges of old pasture, hedgerows, on moist to damp usu clay soils, PN poor to med, base med to rich, mod acid to calc, ½ shade, tolerant of light grazing and trampling. Typically a woodland edge species on poorly drained but base rich soils. Ass: *Fraga ves, Viola odo, Poten ste, Brach syl, Bromu ram, Ajuga rep.*
Frequent throughout region except on acid soils and intensively farmed areas, its decline being less marked in this region than in some others.



The hybrid (false oxlip *P. veris* × *vulgaris*) is locally frequent in thickets and field edges on limestone, where the parents meet. *(Map above)*
A form of primrose with washy-pink flowers is sometimes found far from gardens, presumably a result of long range cross-pollination with garden flowers.

Water-violet
Hottonia palustris L.

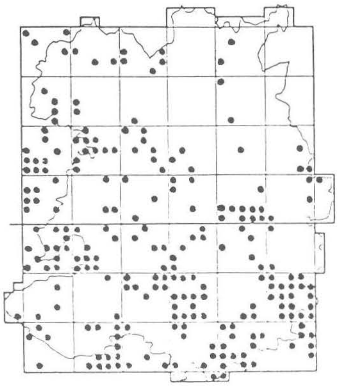
Ponds, wide ditches and disused canals, usu fairly shallow, in standing water or on bare mud, PN med to rich, base med to rich, neut to alk, sun to ½ shade, sheltered, warm, avoiding larger waterbodies and turbulent or running water but tolerant of strong fluctuations in water level. Ass: *Calli sta, Calth pal, Lemna min, Ranun fla, Glyce flu, Apium nod.*
Locally frequent in Shrewsbury area and NW lowland: sparse in mid W and near Ironbridge: absent from most of S and E.



Yellow pimpernel
Lysimachia nemorum L.

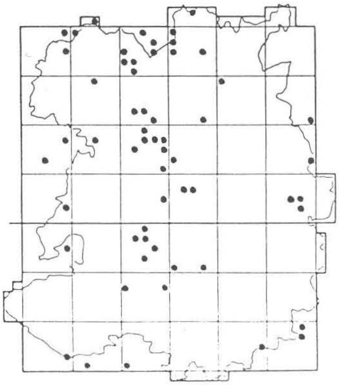
Woodland, scrub, hedgebanks and grassy tracks often on bare patches of ground, on moist to dry but winter-wet soils, usu with impeded drainage, PN med, base med, mod acid to neut, ½ shade to shade. Tolerant of trampling but not of grazing or compet with more vigorous grasses. Ass: *Viola riv, Veron mon, Ajuga rep, Luzul pil, Epilo mon, Poa nem.*
Frequent in suitable habitats throughout region.

Creeping-Jenny
Lysimachia nummularia L.



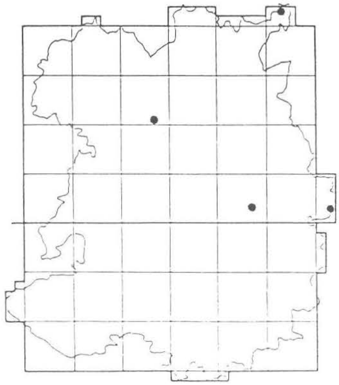
Open places in low-lying damp meadows and pastures or lawns and in grazed grassy woodland, on rides, paths and canal banks, on moist to damp soils with impeded drainage, PN med to rich, base med to rich, mod acid to calc, ½ shade, sheltered, cool, tolerant of trampling and light grazing, a poor competitor with taller plants. Ass: *Senec aqu, Myoso sco, Ranun acr, Oenan fis, Juncu art, Carex otr, Agros sto.*
Locally frequent throughout region esp in SE: sparse in Clun Forest area and NE lowlands.

Yellow loosestrife
Lysimachia vulgaris L.



In open carr, tall fen or reedswamp, by slow ditches and banks of canals, rivers and lakes, on moist or winter-wet mud, silt or peat, PN rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered, intolerant of grazing but a strong competitor. Ass: *Lythr sal, Calys sep, Phala aru, Carex pata, Sparg ere, Poten pal.*
Locally frequent in lowlands from Ellesmere to Shrewsbury and Church Stretton: sparse elsewhere.

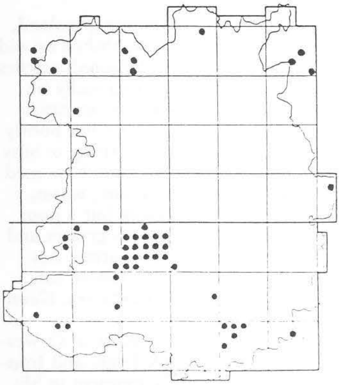
Dotted loosestrife
***Lysimachia punctata** L.



A garden escape, well established and increasing at a few lowland localities: at Boningale (1976 BRF); Woore (1977 BRF); Merrington Green (1980 CAS); and Benthall (1982 WAT).

Bog pimpernel
Anagallis tenella (L.) L.

Spring-flush lawns and short fen, on wet to moist waterlogged, often peaty or silty soil, usu with seeping water supply, PN poor to med, base med to rich, acid to calc, sunny, open, often heavily grazed and tolerant of trampling but a poor competitor with taller



plants. Upland and lowland sites differ markedly in conditions and associates. Ass: Lowland; *Sagin nod, Ranun fla, Trigl pal, Juncu bul, Carex pcea, Carda pra.*
Upland; *Myoso sec, Monti fon, Pingu vul, Carex ech, Carex pul.*
Locally frequent in Long Mynd and Stretton hills; Clee hills; Oswestry upland: rare elsewhere. Formerly frequent but now much reduced around N Shropshire meres.

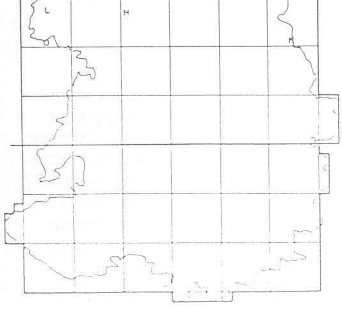
Scarlet pimpernel
'Wink-and-peep', 'Winkie pip'
Anagallis arvensis L.

Arable fields, gateways, waste ground, railway sidings, on dry but sometimes winter-wet soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm, a pioneer plant of open habitats. Ass: *Sperg arv, Viola arv, Polyg per, Matri rec, Sinap arv.*
Less common than formerly as a cornfield weed but still locally frequent throughout lowland parts of region.

Chaffweed
†Anagallis minima (L.) E.H.L. Krause
(*Centunculus minimus* L.)

Probably extinct.
Found in Wyre Forest in 1882 (see 2.11). Recorded in *ABF* for SJ 51 "Haughmond Hill – wet heath – apparently rare" (1958 AMcGS).

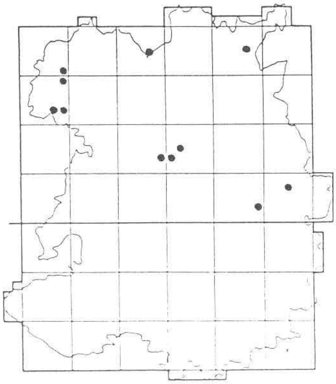
Brookweed
Samolus valerandi L.



Calcareous fen, flushes and ditch sides, on moist water-logged clay or peat, PN poor, base rich, calc, sunny and warm. Tolerant of trampling and light grazing but a poor competitor, generally growing on bare patches of ground. Normally regarded as a maritime species but also typical of open spring-fen communities in lowlands. Ass: *Sagin nod, Carex lep, Juncu sub, Valer dio, Epipa pal, Parna pal.*
Very rare: only recent localities are SE shore of Crose Mere (1970 CAS), ditch on Baggy Moor (1984 R Porley); formerly recorded from Trefonen; Westonwharf; near Newport; and from Carreghofa (v c 47) after 1950 by E Milne-Redhead.

BUDDLEJA FAMILY
BUDDLEJACEAE

Butterfly-bush
***Buddleja davidii** Franchet



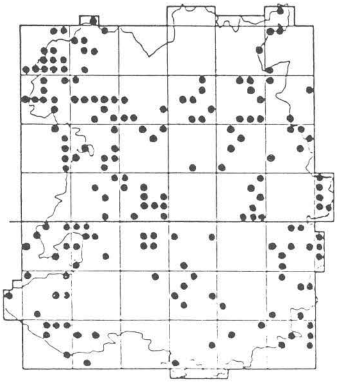
Established and still increasing as a colonist of cracks and mortar crevices in decaying brick walls, on building sites, railway ballast and waste ground, on dry soils, PN med, base rich, neut to calc, sunny and warm. This has become an important pioneer species of a specialised habitat. Ass: *Senec squ, Chame ang, Arrhe ela, Epilo cil, Parie jud, Cymba mur.*
Locally frequent in Oswestry; Shrewsbury; and Telford area: rare elsewhere to present, but increasing.

OLIVE FAMILY
OLEACEAE

Ash
Fraxinus excelsior L.

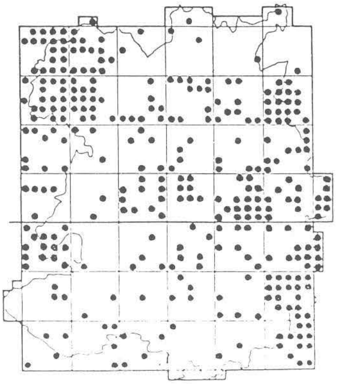
Woodland, scrub, hedges, disused quarries, old railway lines, banks of rivers, streams and meres, on moist to dry sometimes winter-wet or water-logged clay or loam soils, PN poor to rich, base med to rich, mod acid to calc, sun to ½ shade. An important pioneer tree species on base-rich soils and a former dominant in certain types of old woodland (esp valley woods), whose place is now largely taken over by sycamore. Still one of the commonest hedgerow trees in the region. Ass: *Querc rob, Coryl ave, Acer cam, Ulmus gla, Sambu nig, Prunu avi, Acer pse.*
Frequent throughout region.

Lilac
***Syringa vulgaris** L.



Well established introduction in hedges and old gardens, occasionally in quarries. Locally frequent in Oswestry uplands; W Central hills; Bridgnorth area; and parts of N Shropshire plain: sparse elsewhere.

Wild privet
Ligustrum vulgare L.



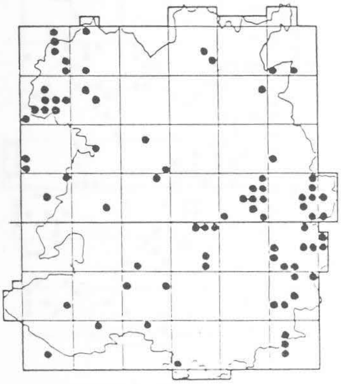
Woodland edges, thickets and hedgerows on dry soils, PN med, base med to rich, neut to calc, sun to ½ shade, sheltered, avoided by grazing animals, favoured by limestone by not confined to it. Ass: *Crata mon, Coryl ave, Cornu san, Euony eur, Daphn lau.*
Frequent in Oswestry uplands and Lower Severn Valley: locally frequent elsewhere.

Garden privet
***Ligustrum ovalifolium** Hassk.

V. commonly planted as a hedging shrub but not truly naturalised. Devastated by the winter of 1981–82 in the Shrewsbury area.

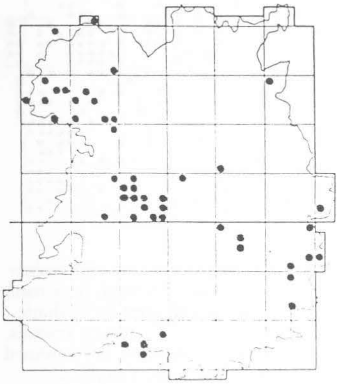
PERIWINKLE FAMILY
APOCYNACEAE

Lesser periwinkle
***Vinca minor** L.



Well established but probably never native in wooded dingles, ornamental woods, wild gardens and shady hedgebanks, often forming extensive patches, on damp heavy soils, PN med to rich, base med to rich, mod acid to neut, ½ shade to shade, sheltered. Ass: *Hyaci non, Galiu apa, Geum urb, Mercu per, Glech hed.*
Locally frequent in Oswestry uplands; Worfe Valley areas: sparse elsewhere.

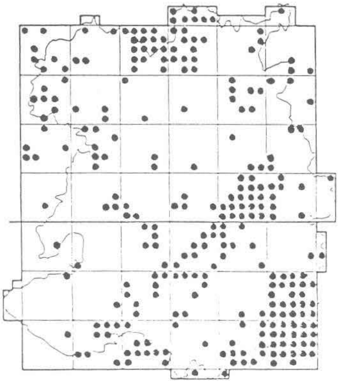
Greater periwinkle
***Vinca major** L.



Established on hedgebanks and shady roadside verges, usu near gardens, but persisting long after their abandonment. Never native.
Locally frequent in Oswestry and Pontesbury areas: sparse elsewhere.

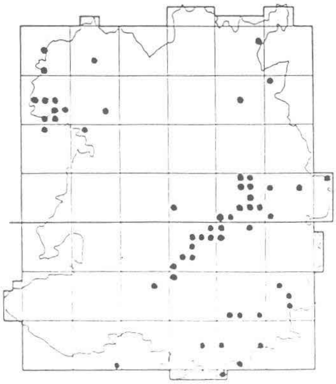
GENTIAN FAMILY
GENTIANACEAE

Common centaury
'Bloodwort'
Centaurium erythraea Rafn
(*C. minus* Moench, *Erythraea centaurium* (L.) Pers.; incl *C. capitatum* (Willd.) Borbás)



Open ground and bare patches in old meadows and scrub, woodland glades, banks, quarries and spoil heaps, abandoned railway lines and track sides, often on limestone or sandy clay soils, damp to dry but with impeded drainage and often compacted by trampling, PN poor, base med to rich, mod acid to calc, sunny, warm, sheltered, tolerant of trampling and light grazing but not of compet with vigorous grasses. A characteristic species of a somewhat transient community favoured by high base status, poor drainage, full sunlight and low compet. Ass: *Linum cat, Dacty fuc, Polgy vul, Briza med, Lotus cor, Black per, Prune vul, Carex fla.*
Frequent in Lower Severn Valley; Ludlow; and Wenlock Edge areas: locally frequent in Ellesmere-Whitchurch area and Oswestry uplands: sparse elsewhere and rare in W Central hills and Clun Forest.

Yellow-wort
Blackstonia perfoliata (L.) Hudson

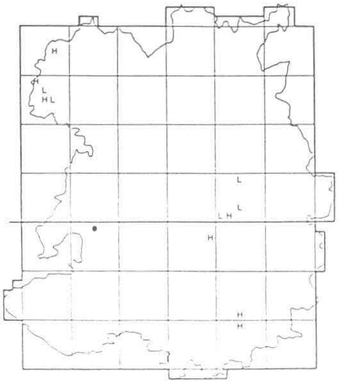


Open swards in limestone grassland, esp old pastures, or established on old lime spoil and floors of disused quarries and clay workings, occasionally on calcareous soils elsewhere, eg canal towpaths, on damp to dry but poorly drained and winter-wet, stony or silty clay soils, PN poor to med, base med to rich, neut to calc, sunny, warm, fairly tolerant of grazing but a poor competitor with vigorous grasses and so characteristic of bare areas. Ass: *Anaca pyr, Sangu min, Linum cat, Carex fla, Scabi col, Centa ery, Genti ama, Briza med.*
Frequent in limestone parts of Oswestry uplands; Wenlock Edge; and Ironbridge Gorge: locally frequent in SE: sparse elsewhere and absent from most of N Shropshire plain and SW uplands.

Marsh gentian
Gentiana pneumonanthe L.

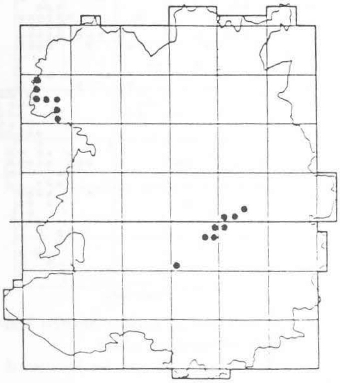
Open trampled patches in damp heathland on moist winter-wet soils, PN poor, base poor, acid, sunny, exposed, grazed and heavily trampled by horses, the hoof prints probably forming ideal sites for seedling establishment. A poor competitor with taller heathland plants unless they are grazed and trampled. Ass: *Erica tet, Dacty eri, Succi pra, Poten ere, Molin cae, Nardu str, Juncu squ, Juncu bul, Danth dec.*
V. rare: known since early 1950s (and perhaps longer) from its locality in the Catherton Common area: reported by Miss Aston to CAS in 1962. Protected by informal agreement.

Field gentian
Gentianella campestris (L.) Börner



The only recent record is for an old scrubby pasture at The Napp near Tankerville (NCC Grassland Survey 1981). Formerly recorded from limestone outcrops in Oswestry uplands; Limekiln Wood; Much Wenlock to Benthall Edge; and Farlow. Severe decrease or overlooked (almost certainly the former).

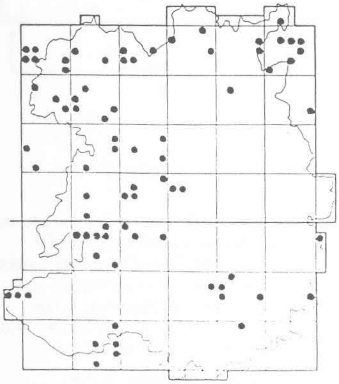
Autumn gentian
Gentianella amarella (L.) Börner



Calcareous pastures, limestone quarry floors and spoil, on damp to dry sometimes winter-wet stony clays or loams, PN poor, base rich, neut to calc, sunny, tolerant of heavy grazing but a poor competitor in tall swards. Ass: *Sangu min, Black per, Anaca pyr, Briza med, Leont his, Centa ery.*
V. locally frequent on limestone outcrops in Oswestry upland; and Wenlock Edge to Benthall Edge area.

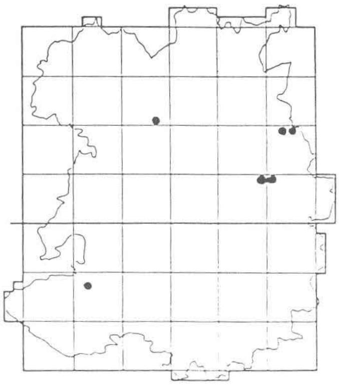
BOGBEAN FAMILY
MENYANTHACEAE

Bogbean
Menyanthes trifoliata L.



Edges of pools and in ditches and canals or on boggy ground in shallow water or on wet, often peaty soil, PN poor (to rich), base poor to rich, acid to neut, sun to ½ shade, often forming extensive floating rafts on sheltered waters. Although characteristic of acid nutrient-poor habitats, bogbean is sometimes found in extremely nutrient-rich and even polluted sites where it grows with great vigour. Ass: Marsh- *Poten pal, Eleoc pal, Carex ros, Galiu pal, Equis flu;* Open water – *Potam nat, Sparg ere, Lemna tri.*
Common in W of region: locally frequent from Oswestry uplands across N plain to Market Drayton and southwards to Shrewsbury: and W Central hills; in Clee hills; and Bucknell area.

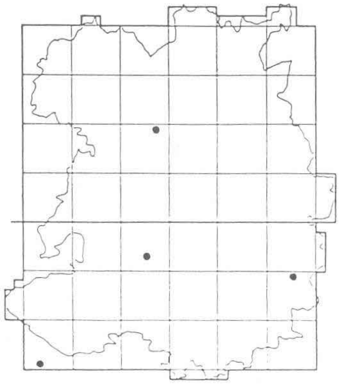
Fringed water-lily
***Nymphoides peltata** (S.G. Gmelin) O. Kuntze



Introduced and long estabished in nutrient-rich pools and canals.
Rare; Edgmond near Newport; Hodre Pond at Chapel Lawn; and recently introduced into a pool at Merrington Green; latest records for pond on Hollinswood Road, Snedshill (Telford); and Withy Pool, Telford Town Park (1984 J. Box).

JACOB'S-LADDER FAMILY
POLEMONIACEAE

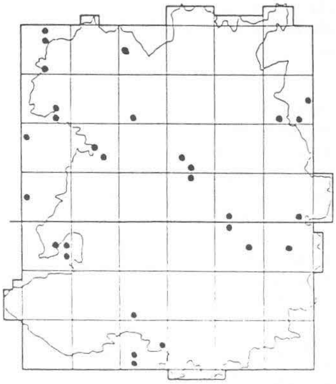
Jacob's-ladder
***Polemonium caeruleum** L.



Long established but probably always a garden escape in this region, on stream sides, in open woodland and on roadside verges near Leaton. Church Stretton; Dudmaston Hall; and Cefnsuran, Llangunllo.

BORAGE FAMILY
BORAGINACEAE

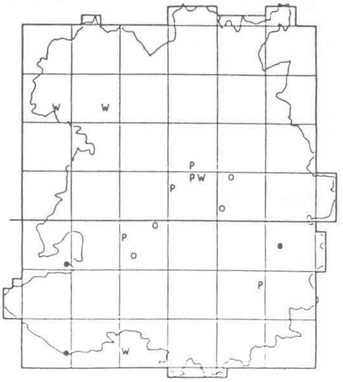
Hound's-tongue
Cynoglossum officinale L.



Bare or disturbed areas in grassland on dry stony or loamy soils, PN rich, base rich, mod acid to calc, sunny, warm, exposed, avoided by grazing animals and often associated with rabbit warrens. Ass: *Verba tha, Digit pur, Ulex eur, Cardu nut, Urtic dio, Cirsi arv, Cardu aca, Senec jac.*
Sparse to v. locally frequent in Oswestry upland; SW parts of Shropshire plain; Much Wenlock to Bridgnorth area; and Ludlow area.

Abraham-Isaac-Jacob
***Trachystemon orientalis** (L.) D.Don
A well established garden escape on a shaded lane-side under a hedge at Benthall (1982 WAT).

Common comfrey
Symphytum officinale L.



○ pre-1900 herbarium specimens
● post-1968 records, det FHP
P carmine pink
W creamy white

Roadside verges, ditches and banks of rivers, on wet to damp soils, PN rich, base med to rich, neut to calc, sun to ½ shade, sheltered. A vigorous competitor, intolerant of grazing. Ass: *Glyce max, Rumex hyd, Rumex obt, Solan dul, Eupat can, Epilo hir.*

Occurs in two colour forms, with carmine and cream flowers. The former is most frequent by the R Severn and its tributaries near Shrewsbury: the latter is scattered in the S and W of the region, mainly on verges and in ditches. Both forms occur together on R Tern in Attingham Park.

Russian comfrey
Symphytum × uplandicum Nyman

Roadside verges, ditch, pond, canal and river sides, on wet to dry soils, PN rich, base med to rich, neut to calc, sun to ½ shade. A vigorous competitor often forming extensive stands 100m or more in length. Ass: *Urtic dio, Holcu lan, Rumex obt, Epilo hir, Stach syl, Herac sph, Anthr syl.*

Occurs in two forms: one with unopened flower-buds pink, and leaves slightly decurrent and rather softly hairy; the other with purple buds, non-decurrent and roughly hairy leaves. Scattered throughout the lowlands: the pink-budded form appears to be more frequent.

S. × uplandicum is the name given to hybrids with *S. officinale* of **S. asperum** Lepechin, which FHP does not believe to be naturalised in the Shropshire Region.

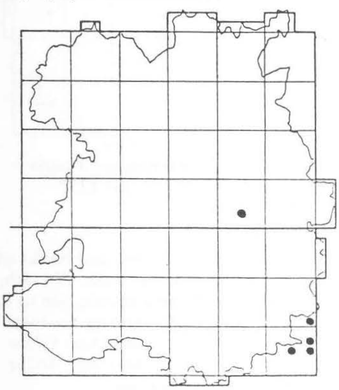
Tuberous comfrey
***Symphytum tuberosum** L.

Established on roadside verges at Longnor and Upper Cound. Recorded in *ABF* for SO 29 and 77.

Creeping comfrey
***Symphytum ibiricum** Steven
(*S. grandiflorum* auct., non DC.)

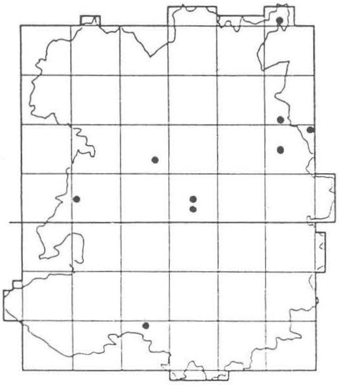
Established on shaded grassy roadside verges at Smethcott and at Chatwall. A *S. ibiricum* cultivar, 'Hidcote Blue', has escaped in Roundhill Wood near Chetwynd Heath, and is described in 1982 *BSBI News* No 30, 16: it was first reported as **S. tauricum** (1978 BRF).

White comfrey
***Symphytum orientale** L.



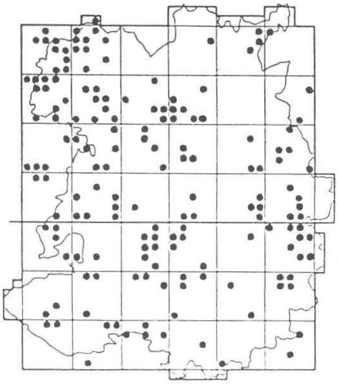
A garden escape established on railway banks, waste ground and roadside verges at Benthall Hall and outside Shropshire in the Bewdley area.

Borage
***Borago officinalis** L.



Well established garden escape on edges of fields, roadside banks and waste ground.
At a number of localities, mainly in S and E parts of Shropshire plain.

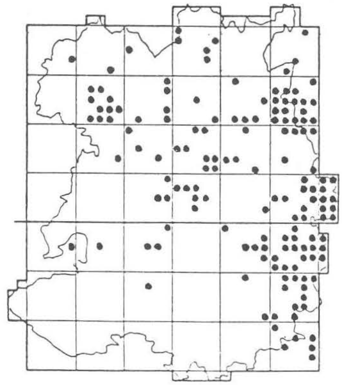
Green alkanet
***Pentaglottis sempervirens** (L.) Tausch ex L. H. Bailey



Grassy roadside verges. Originally a garden escape but long established and often far from present habitations. Sparse to locally frequent throughout region esp in lowlands.

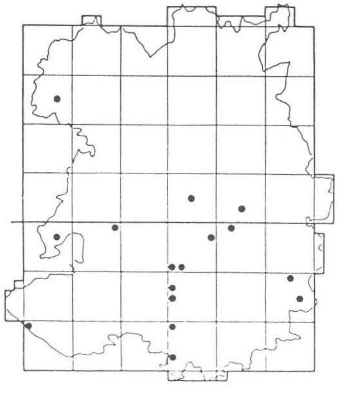
Bugloss
Anchusa arvensis (L.) Bieb.
(*Lycopsis arvensis* L.)

Edges of arable fields and bare patches in established grassland (eg around rabbit warrens), or on other disturbed ground on dry sandy soils, PN med to rich, base poor to med, mod acid, sunny, warm and open. Avoided by grazing animals but intolerant of compet with taller plants. Ass: *Erodi cic, Aphan arv, Arena ser, Sperg arv, Scler ann, Viola arv, Resed lola.*



Locally frequent in Lower Severn Valley and N Shropshire plain.
A distinctly lowland species favoured by warmth.

Lungwort
'Mary-spilt-the-milk', 'Virgin-Mary's-Cowslip', 'Virgin-Mary's-honeysuckle', 'Mary and Joseph', 'Mind-your-own-business', 'Muslin gown', 'Tom and Mary'
***Pulmonaria officinalis** L.



Long established as a garden escape in open deciduous woodland, conifer planatations and shaded roadside banks and dingles, often on calcareous soil. Locally frequent in Wenlock Edge area: sparse in Oswestry; Ludlow; and Bridgnorth areas: rare elsewhere.

***Amsinckia lycopsoides** (Lehm.) Lehm.
(*A. intermedia* auct. non Fischer & C. A. Meyer)

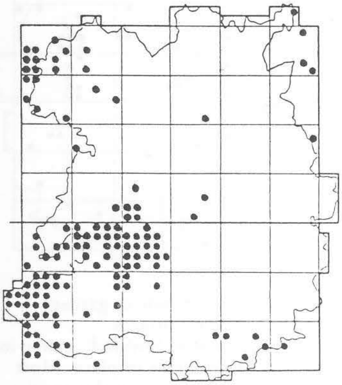
One large plant found near an old midden in a farmyard (Hillend Farm) near Mainstone (1982 Kate Jones).

Water forget-me-not
Myosotis scorpioides L.

Ditches, edges and banks of rivers, streams, ponds and canals, often growing submerged in shallow, still or slow-flowing water or on wet mud in winter-flood zone, PN med to rich,

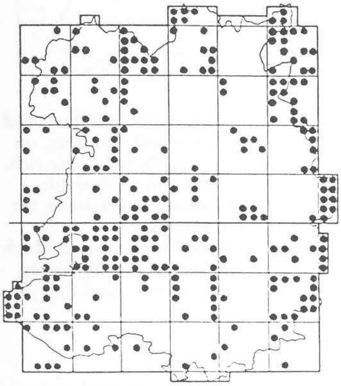
base rich, neut to alk, sun to ½ shade, sheltered. An amphibius pioneer of water margins but vigorous enough to compete with tall neighbours. Ass: *Veron bec, Menth aqu, Apium nod, Rorip amp, Polyg hyd, Phala aru, Ranun rep.*
Frequent throughout region esp in lowlands.

Creeping forget-me-not
Myosotis secunda A. Murray



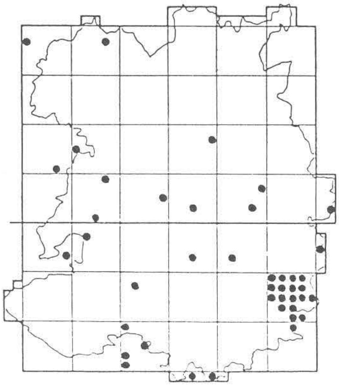
Upland springs, shallow runnels and flushes, on wet to moist loamy soils or in clear water, PN poor to med, base med to rich, mod acid to neut, sunny, sheltered, tolerant of grazing and trampling but a poor competitor with more vigorous plants. A characteristic member of the grazed spring turf community. Ass: *Monti fon, Lythr por, Carda fle, Ranun fla, Stell als, Phil font, Marc poly.*
Locally frequent in higher parts of Oswestry uplands; W Central hills; Clun Forest: sparse elsewhere and rare in lowlands.

Tufted forget-me-not
Myosotis laxa Lehm.
ssp. **caespitosa** (C.F. Schultz) Hylander



Edges of ditches, ponds and streams, in wet hollows in fields and in marshy ground with permanently high water-table, on clay, silt, mud or peat, PN med, base poor to med, acid to neut, sun to ½ shade, open, tolerant of light grazing but not of tall vegetation. Sometimes a pioneer on bare mud. Ass: *Veron bec, Ranun fla, Glyce flu, Ranun sce, Galiu pal, Agros sto, Alope gen.*
Locally frequent in suitable habitats throughout the region. Commoner than *M. scorpioides* in uplands.

Wood forget-me-not
Myosotis sylvatica Hoffm.



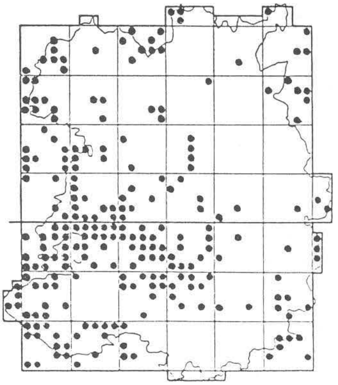
Woods, dingles and shady banks and verges, on damp clay or loam soils, PN med, base med to rich, mod acid to neut, shaded, sheltered, ungrazed. Ass: *Ajuga rep, Carex pen, Circa lut, Festu gig, Geran rob, Glech hed, Lamia gal, Veron mon.*
Frequent in Lower Severn Valley: sparse elsewhere but probably overlooked.

Field forget-me-not
Myosotis arvensis (L.) Hill
Arable fields, waste ground, disturbed areas on roadsides and near buildings, on dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm, intolerant of grazing or compet. Ass: *Capse bur, Stella med, Viola arv, Polyg per, Poa ann.*
Frequent throughout region esp in lowlands.

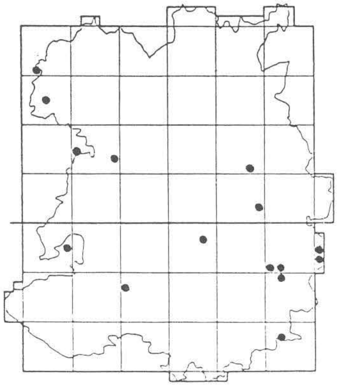
Changing forget-me-not
Myosotis discolor Pers.

On bare patches or disturbed ground in old permanent pasture, frequently on ant hills, and in arable fields and sand pits, on dry sandy soils, PN poor to med, base med to rich, mod acid to neut, sunny, warm, exposed. A member of the winter-annual community of warm sandy sites. Ass: *Hiera pil, Carex car, Rumex alla, Aphan arv, Festu ovi, Tarax lae, Aira pra, Veron arv, Teesd nud.*
Commoner in W of region esp W Central hills; Oswestry uplands; and Clun Forest: locally frequent to sparse elsewhere.

(Map: next column)

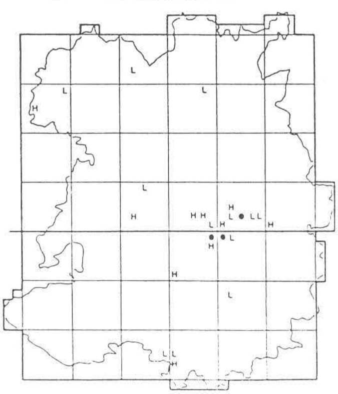


Early forget-me-not
Myosotis ramosissima Rochel
(*M. hispida* Schlecht.)



Bare patches, rock outcrops and short open turf, on dry banks, verges, old quarries and sand pits, on dry soils, PN poor, base med to rich, mod acid to neut, sunny, warm. A member of the annual pioneer community on dry open sites. Ass: *Acino arv, Aira pra, Ceras glo, Ceras sem, Geran mol, Hiera pil, Saxif gra, Teesd nud, Trifo cam, Valer loc.*
V. locally frequent in Bridgnorth area: rare elsewhere.

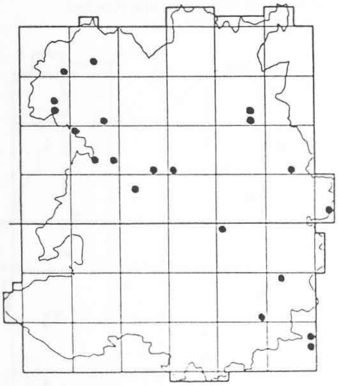
Common gromwell
Lithospermum officinale L.



Disturbed ground and spoil in limestone quarries, track sides and edges of woodland or scrub, on damp to dry soils, PN poor to med, base rich, neut to calc, sun to ½ shade.
Now rare: N end of Wenlock Edge and Benthall. Formerly much more frequent in this area and around Ludlow, with scattered localities throughout region.

Field gromwell
Lithospermum arvense L.
Edges of arable fields and disturbed roadside verges.
V. rare: Ackleton near Badger (1974 HH); Edge near Yockleton (1980 BRF).

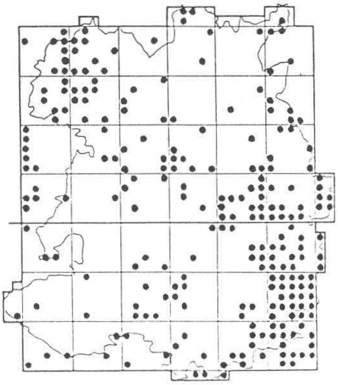
Viper's-bugloss
Echium vulgare L.



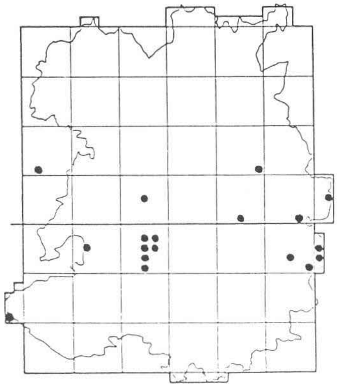
Edges of arable fields, re-seeded pastures, disturbed roadside verges, gateways, bare patches in old grassland, limestone quarries, on dry often shallow soils, PN poor to med, base rich, neut to calc, sunny, warm, exposed. A vigorous pioneer plant of recently disturbed ground, particularly favoured by the liming of fields but seldom persisting long in one place. Ass: *Cardu nut, Silen alb, Resed lola, Verba tha.*
Sparse and local: on limestone outcrops in Oswestry upland; in W and S parts of Shropshire plain; and scattered down Lower Severn Valley. Marked decrease with changes in agricultural practice.

BINDWEED FAMILY
CONVOLVULACEAE

Field bindweed
'Clip-me-Johnny'
Convolvulus arvensis L.
Edges of arable fields, waste ground, railway embankments, track sides, disturbed verges and gardens, on dry often stony soils, PN med to rich, base rich, neut to calc, sunny, warm and open. Ass: *Matri rec, Polyg per, Anaga arv, Viola arv.*
Mainly lowland: frequent in SE; Wenlock Edge area; Oswestry area; and around Shrewsbury: sparse elsewhere.
(Map: next column)



Hedge bindweed
Calystegia sepium (L.) R. Br.
ssp. **sepium**
Hedgebanks, sides of rivers, streams, meres and ponds, open scrub and field edges, on moist to damp winter-wet or intermittently flooded ground, on heavy soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered. A scrambling, twining member of the tall-herb and shrub community between open fields and woodland on fertile soils. Ass: *Solan dul, Artem vul, Tanac vul, Rumex obt, Phala aru, Lysim vul, Epilo hir.*
Frequent to locally abundant throughout lowlands of regions: sparse in uplands.
ssp **sylvatica** (Kit.) Maire, has been recorded but not consistently mapped.

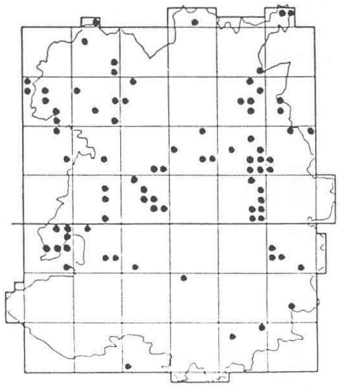


ssp. **pulchra** (Brummitt & Heywood) Tutin occurs as a garden escape well established in hedges and on banks: Church Stretton area; around Bridgnorth; and in scattered localities across S part of the plain.
(Map above)

Dodder
†**Cuscuta epithymum** (L.) L.
Extinct: not seen for many years in this region but formerly recorded on clover at Hencott; Bomere; Hodnet Heath; and on gorse on Charlton Hill.

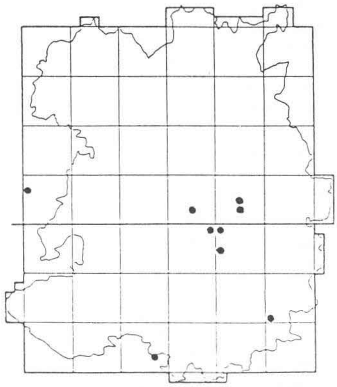
NIGHTSHADE FAMILY
SOLANACEAE

Duke of Argyll's teaplant
***Lycium barbarum** L.
(*L. halimifolium* Miller)



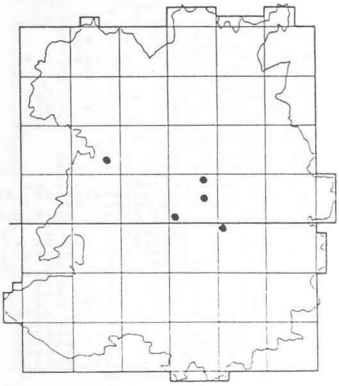
Garden escape or relic in garden hedges, usu near cottages.
Locally frequent in lowland: sparse in hills and arable areas of plain. Most records probably refer to this species. **L. chinense** Miller has not been definitely recorded.

Deadly nightshade
***Atropa belladonna** L.



Quarries, verges, waste and disturbed ground, often near old buildings, on dry to damp soils, PN rich, base rich, mod acid to calc, sun to ½ shade, sheltered. Occasionally persisting for some years in same site.
Local in limestone area around Much Wenlock: also recorded near Kinlet; Brampton Bryan Castle; and Powys Castle.

Henbane
***Hyoscyamus niger** L.
Disturbed and waste ground and gardens, bare places in old pasture, on dry soils, PN rich, base rich, mod acid to calc, sunny, warm, sheltered. Casual

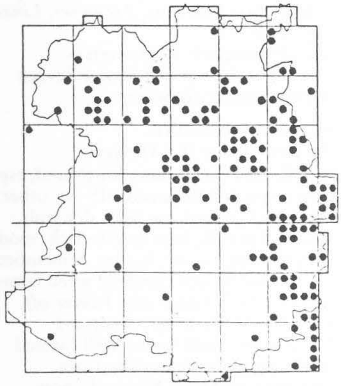


and not persistent.
Sparse: recorded from Alberbury and a few localities in the Shrewsbury to Much Wenlock area.

Bittersweet, Woody nightshade
Solanum dulcamara L.

Edges of ponds, sedge fen, alder carr, ditches, damp hedges but also on old brick walls, rubbish tips and waste ground, on wet to dry soils of very varied character, PN rich, base med to rich, acid to calc, sun to ½ shade, sheltered, warm, ungrazed.
The remarkable ecological range of this species suggests that there may be more than one genetic form with different water relations. It is commonest in this region as a plant of water margins, esp where there has been a rise in the water level, but it is not infrequent in v. dry habitats. Ass: Wet – *Juncu eff, Carex pata, Hydro vul, Lysim vul, Lycop eur;* Dry – *Poa pra, Buddl dav, Chame ang, Epilo cil.*
Frequent throughout lowland: sparse in hill country and absent from highest altitudes.

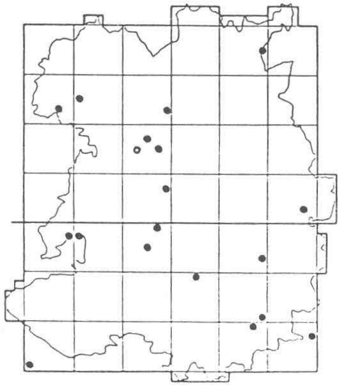
Black nightshade
Solanum nigrum L.



Arable fields, gardens, open and disturbed ground, on damp to dry but well drained loamy soils, PN rich, base med to rich, mod acid to neut, sunny, warm. A pioneer weed of rich soils in lowland sites. Ass: *Capse bur, Cheno alb, Matri mat, Fallo con, Polyg avi, Polyg per, Stell med, Tripl mar.*
Frequent throughout most of lowland with a markedly thermophilous distribution: rare in hills.

The alien **S. sarrachoides** Sendtn. was reported from vc 40 during the Black Nightshade Survey in 1981 *BSBI News* No 28, 8.

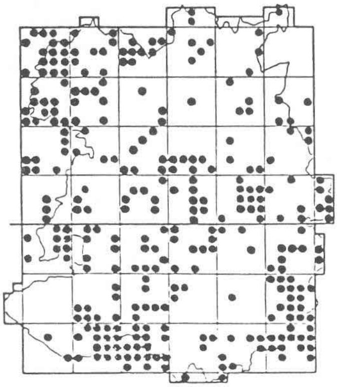
Thorn-apple
***Datura stramonium** L.



Arable fields, gardens, waste ground, rubbish tips, cleared woodland, manure heaps and temporary pastures, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny, warm. A sporadic weed often associated with sugarbeet, potatoes and other non-cereal crops, usu eradicated on sight by farmers.
Local and impersistent in most parts of lowland: rare in uplands.

FIGWORT FAMILY
SCROPHULARIACEAE

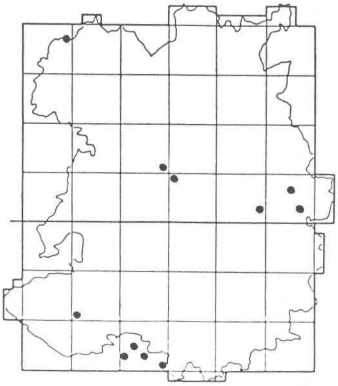
Great mullein, Aaron's rod
Verbascum thapsus L.



Bare open recently disturbed ground esp in or near quarries, railway sides, gardens and on walls, rocks and scree, in dry sandy to stony or rocky soil, PN med, base med to rich, mod acid to calc, sunny, warm and open, ungrazed and sometimes associated with rabbit activity. Ass: *Digit pur, Resed lola, Chame ang, Daucu car, Agrim eup, Teucr sco.*
Frequent throughout region.

White mullein
†**Verbascum lychnitis** L.
Old records in *LFS* and *ABF* for SO 57,77, SJ 50.

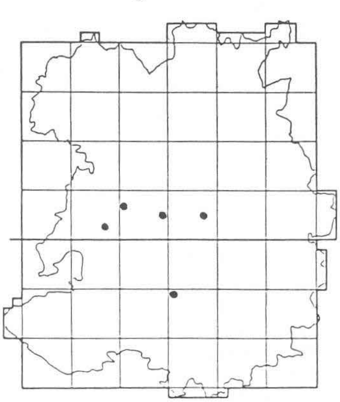
Dark mullein
Verbascum nigrum L.



Waste ground, rubbish tips, bare verges and weedy banks and gardens, on dry but sometimes poorly drained soils, PN med to rich, base med to rich, mod acid to calc, sunny, exposed.
V. local around Shrewsbury; Telford; and in the Teme Valley near Downton.
The hybrid **V × semialbum** Chaub. has been recorded from Chirk.

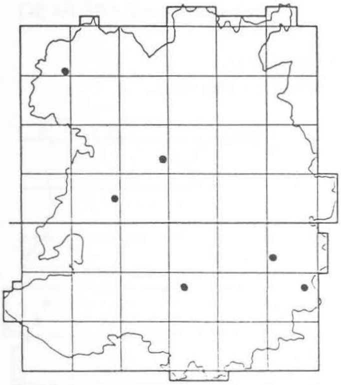
Moth mullein
***Verbascum blattaria** L.
Naturalised and seeding freely at Inwood House near All Stretton (1979 HMD); and disturbed gravel by the R Teme at Leintwardine (1981 RR).

Twiggy mullein
***Verbascum virgatum** Stokes



Casual and impersistent on verges, disturbed ground, mine waste and railway ballast at various localities in the middle of region. Wetmoor, Munslow (1976 MSF); Snailbeach (1967 SRT); Pontesford (1963 CAS); Condover Park (1976 DME); old railway line near Cound (1975 PP).

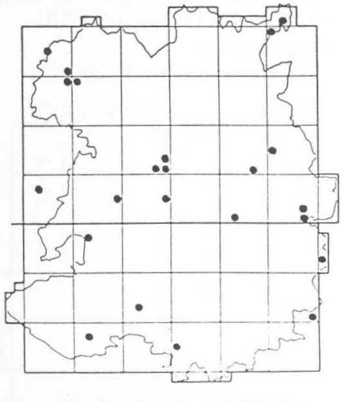
Snapdragon
***Antirrhinum majus** L.



Old walls, ruins, cliffs, rubbish dumps and abandoned railway sidings, on dry stony soils or in mortar, PN med, base rich, calc, sunny, warm. A pioneer species, sometimes persisting for many years. Ass: *Parie jud, Cymba mur, Senec squ, Buddl dav.*
Sparse: generally in or near towns or villages.

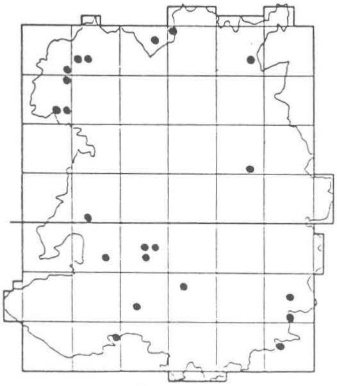
Lesser snapdragon
$Misopates orontium (L.) Rafin.
Not in v c 40.
Several plants in rickyard of a farm on sandy soil near Bewdley v c 37 (1976 L J).

Purple toadflax
***Linaria purpurea** (L.) Miller



Naturalised and well established on waste ground, abandoned railway sidings and tracks, in quarries and on old walls and heaps of rubbish, on dry often stony soils or mortar, PN poor to med, base rich, calc, sunny, warm, exposed. Competes well and persists in its specialised habitat. Ass: *Crepi cap, Leuca vul, Poa pra, Linar rep, Linar vul, Melil off, Epilo cil.*
Locally frequent in lowland esp in towns and villages.

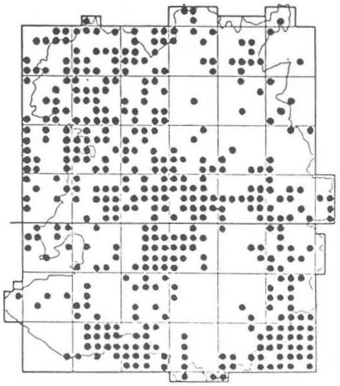
Pale toadflax
Linaria repens (L.) Miller



Disused railway tracks and sidings, cinder paths, bare verges, esp where chippings have been dumped, on dry stony soils, PN med, base rich, neut to calc, sunny, warm, a pioneer species tolerant of light grazing or mowing but a poor competitor with tall or dense vegetation. Ass: *Chaen min, Senec vis, Geran rob, Poten rep, Myoso arv, Crepi cap, Epilo cil.*
Local in Oswestry area; Church Stretton area; and Lower Severn Valley: sparse elsewhere in SW and NE of region.
The hybrids *L. purpurea* × *repens* (**L. × dominii** Druce) and *L. repens* × *vulgaris* (**L. × sepium** Allm.) have both been reported from cindery ground on the old railway track between Ketley Station and the M54 (1982 WAT, confirmed by PMB and ICT); the latter is also by the Severn Valley Railway track about 50m S of Highley Station (1979 WAT, confirmed ICT) and at top of Trevor Hill Rd, Church Stretton (1979 HMD).

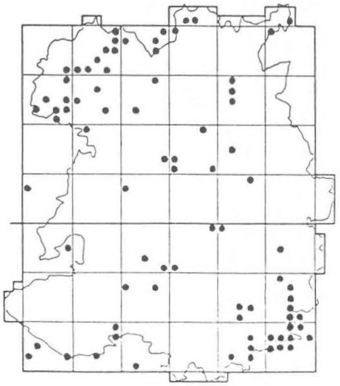
Common toadflax
'Brideweed', 'Dragon'
Linaria vulgaris Miller

Hedgebanks and open verges, railway embankments and other disturbed ground, on dry often stony or sandy soils, PN med to rich, base med to rich, mod acid to neut, sunny, warm, exposed, intolerant of grazing or trampling but favoured by intermittent mowing or burning and therefore typical of the herbaceous community beside railway lines. Ass: *Elymu rep, Arrhe ela, Malva syl, Sisym off, Ballo nig.*



Frequent throughout region on lighter soils, but notably sparse in Clun Forest and Clee Hill areas and in parts of arable NE.

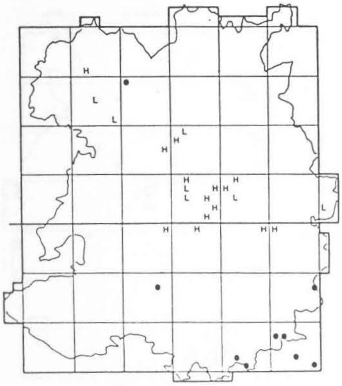
Small toadflax
Chaenorhinum minus (L.) Lange



Limestone ballast of disused railway tracks on dry stony soils, PN enriched, base rich, calc, sunny, warm, a pioneer species often in almost pure stands in this specialised habitat, where compet is low. Ass: *Senec vis, Arena ser, Linar rep, Epilo cil.*
Locally frequent in Oswestry–Whitchurch area and Lower Severn Valley: sparse elsewhere.

Sharp-leaved fluellen
Kickxia elatine (L.) Dumort.
Arable fields or former ploughland, esp near edges, and occasionally on other disturbed ground, on light dry soils, PN med to rich, base med to rich, mod acid to neut, sunny, warm. A member of the species-rich cornfield weed community. Ass: *Anaga arv, Fumar off, Papav rho, Shera arv, Sinap arv.*
Once v. common in the well farmed lowlands of N Shropshire from Oswestry to Much Wenlock, now much reduced by change in agricultural methods and almost restricted to extreme SE of region.

(Map: next column)



Ivy-leaved toadflax
***Cymbalaria muralis** P. Gaertner, B. Meyer & Scherb.

Tops and mortar joints of old brick walls, sometimes spreading on to nearby weathered concrete or heaps of building rubble, on dry soils (though rooted deep in moist cracks), PN poor to med, base rich, calc, sun to ½ shade, warm, exposed. Ass: *Poa pra, Parie jud, Centr rub, Asple rut, Asple tri, Sedum acr.*

An efficient pioneer in its specialised habitat, where it ensures the establishment of its seeds by changing from positive to negative light response after fertilisation so that the outward-facing flowers are followed by capsules on elongated stalks seeking the dark.

Locally frequent throughout region, esp in lowlands.

Common figwort
Scrophularia nodosa L.

Edges of woodlands, open scrub, neglected hedgebanks, sides of ditches, streams and rivers, on moist to damp but well drained, usu loamy soils, PN med, base med to rich, mod acid to neut, ½ shade, sheltered, a strong competitor in tall herb communities but intolerant of mowing or grazing. Ass: *Herac sph, Arrhe ela, Chame ang, Allia pet, Anthr syl, Elymu rep.*

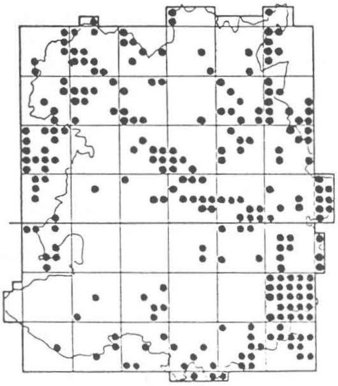
Frequent throughout region esp in lowlands.

Water figwort, Water betony
Scrophularia auriculata L.
(*S. aquatica* auct., non L.)

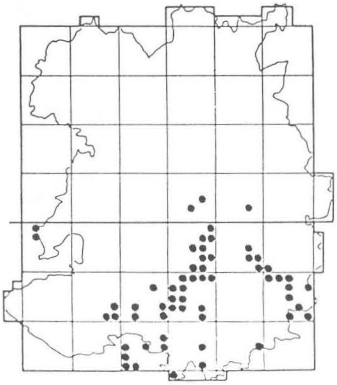
Banks of rivers, streams, ponds and canals, on moist to damp, winter-wet often clay or loamy soils, PN med, base med to rich, mod acid to neut, sun to ½ shade, sheltered, intolerant of heavy grazing but often found in cattle-trampled areas. Ass: *Senec aqu, Rumex con, Cirsi pal, Filip ulm, Angel syl.*

Locally frequent in lowlands esp Lower Severn Valley area: sparse in hill country and absent from the higher ground.

(Map: next column)



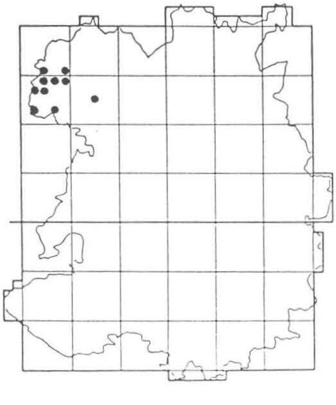
Green figwort
Scrophularia umbrosa Dumort.



Banks of streams, small rivers and ditches, on wet to damp, intermittently flooded clay soils, PN med to rich, base med to rich, mod acid to neut, ½ shade to shade, sheltered, warm, ungrazed. Ass: *Angel syl, Myoso sco, Menth aqu, Lycop eur, Calys sep, Oenan cro.*

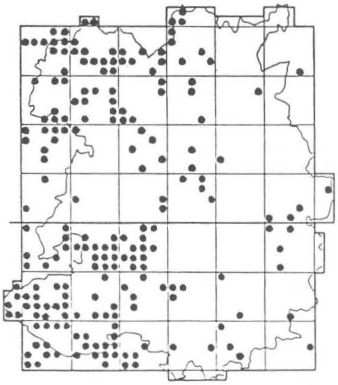
Distribution mainly restricted to the boundary area of the Clee hills platform, along Corve Dale and the Lower Severn Valley with outlying records near Montgomery.

Yellow figwort
***Scrophularia vernalis** L.



Naturalised and long established on roadside walls and rocky banks at a number of localities in limestone uplands near Oswestry, with one record from The Nursery at West Felton. Said to have been introduced in late 17th century by Edward Lhwyd of Llanforda (but see 2.3).

Monkeyflower
'Wild snapdragon'
***Mimulus guttatus** DC.



Edges of rivers, canals and streams, rooted in silt or mud and sometimes submerged, in wet to moist, intermittently flooded sites. PN poor to med, base med to rich, acid to neut, sun to ½ shade, tolerant of trampling and grazing.

Locally abundant along certain swift rocky hill streams and maintained canal banks. Ass: Hill streams – *Agros sto, Veron bec, Juncu art, Ranun fla, Menth aqu;* Canal banks – *Lycop eur, Stach pal, Galiu pal, Myoso sco, Berul ere.*

A v. well naturalised alien, first recorded in Shropshire in 1879 at Preston Montford by Miss Lloyd as *M. luteus.*

Locally frequent in W of region esp in hill country: sparse in the E.

Blood-drop-emlets
***Mimulus luteus** L.

Commonly planted in water gardens and occasionally naturalised by steams and ditches eg in the Morlas Brook (1982 MW); and near Corndon Hill (1978 JAW).

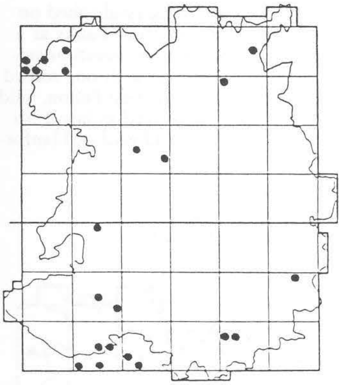
The hybrid *M. guttatus* × *luteus* has also been recorded.

Musk
***Mimulus moschatus** Douglas ex Lindley

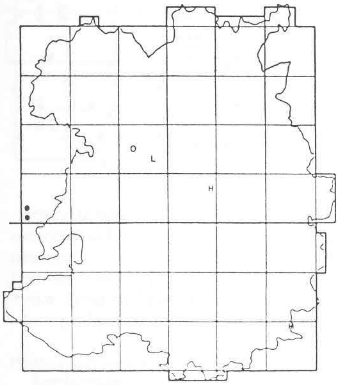
Formerly cultivated in gardens and widely naturalised by pools, streams and rivers and in damp shady places near buildings where it may persist for many years.

Locally frequent in Oswestry area and SW of region: sparse elsewhere.

(Map overleaf)



Mudwort
Limosella aquatica L.



Rivers, ditches and pools on bare mud, silt or muddy gravel in lower part of winter flood zone, PN rich, base rich, neut to alk, sunny. An elusive and easily overlooked pioneer colonist. Ass: *Calli sta, Myoso sco, Polyg hyd.*
Rare: R Severn at Preston Montford (1963 CAS); and in v c 47 near The Grove, (1979 FHP & SS) and at Glan Severn near Forden (1982 ICT; 1959 VJM). Formerly known from R Severn at Shelton Rough *LFS*; Pools about Buttonoak, Wyre Forest *HFS*; and pool on Charlton Hill *HFS*.

Fairy foxglove
***Erinus alpinus** L.

Naturalised on field side only of old stone and brick wall, and on brick ledges, at Oakhurst, Oswestry (1979 MW & EDP); two plants at foot of wall near Bath House at Viroconium (1982 WEH).

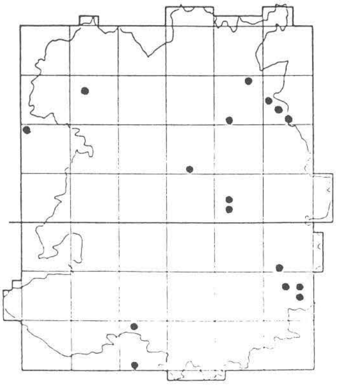
Foxglove
'Ladyglove', 'Lady's fingers', 'Floppy dogs'
Digitalis purpurea L.

Woodland edges and clearings, felled plantations, rides and disturbed ground, open scrub, rocky slopes, outcrops and screes, bare patches in grassland, heath and on verges, on dry often sandy or stony soils, PN med, base poor to med, v. acid to mod acid, sun to shade, seldom grazed, tolerant of mowing and trampling but not persisting long among taller and more vigorous grasses. A characteristic pioneer species often forming extensive stands on recently disturbed ground where the soil is acid and rather infertile. White-flowered forms are commonly cultivated and sometimes occur in wild populations. Ass: *Chame ang, Poa nem, Arrhe ela, Teucr sco, Pteri aqu, Dryop dil, Hyaci non, Holcu mol, Holcu lan.*
Frequent to locally abundant in suitable habitats throughout region.

Brooklime
Veronica beccabunga L.

Edges of ponds and streams, ditches, springs and marshy hollows in fields, in shallow water or on wet intermittently flooded soils, PN med, base med to rich, mod acid to calc, sunny, tolerant of trampling and light grazing, often forming extensive patches at water's edge. Ass: *Apium nod, Nastu off, Glyce flu, Ranun fla, Juncu art, Calth pal.*
Frequent in suitable habitats throughout region.

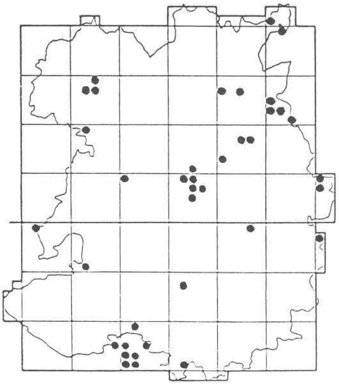
Blue water-speedwell
Veronica anagallis-aquatica L.



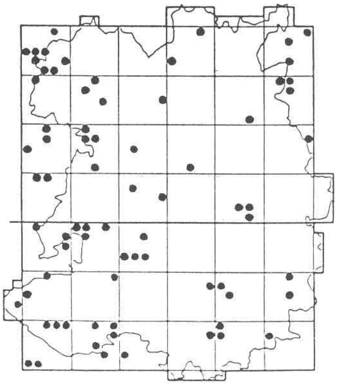
Ponds, pools, ditches, small streams, fens and water meadows in shallow water or on bare mud or trampled clay, PN med to rich, base med to rich, mod acid to calc, sunny. Although a luxuriant plant, this is not a strong competitor with taller species. Ass: *Veron bec, Glyce max, Alism pla, Solan dul, Calli sta, Menth aqu.*
Locally frequent in E of region: sparse near Ludlow and in NW. Apparently less common than *V. catenata.*

Pink water-speedwell
Veronica catenata Pennell

Margins of ponds and pools, ditches, streams, small rivers and disused canals, in shallow water or on bare mud, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. A member of the pioneer community of mud and shallow water. Ass: *Ranun sce, Rumex mar, Lycop eur, Myoso lax, Alism pla, Nastu off, Sparg eme.*
Locally frequent in lowlands and near R Teme: probably under-recorded elsewhere, but apparently rare in hill country.



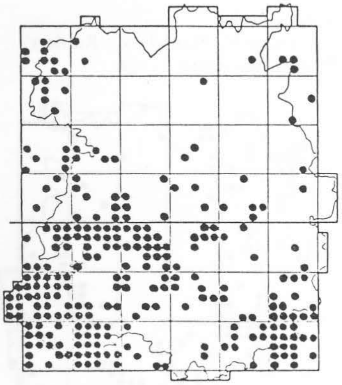
Marsh speedwell
Veronica scutellata L.



Marshes, wet hollows in grassland and flushes, often flooded in winter, on moist to damp, poorly drained soils or peat, PN poor to med, base med, mod acid to neut, sunny, sheltered, tolerant of light grazing. Ass: *Myoso lax, Ranun fla, Menth arv, Alope aeq, Eleoc pal, Juncu art.*
Rather local in W and S: sparse in central and E parts of region.

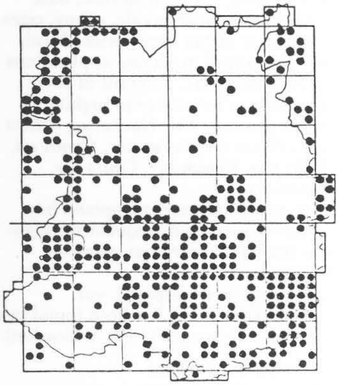
Heath speedwell
Veronica officinalis L.

Old pasture, heathland and grassy banks, on dry sandy, stony or loamy soils, PN poor, base poor to med, acid to mod acid, exposed, sunny and warm. A creeping plant favoured by short sward, tolerant of heavy grazing and of soil disturbance; it is often abundant on ant hills. Ass: *Galiu sax,*



Pimpi sax, Poten ere, Pedic syl, Galiu ver, Thymu pra.
Frequent in hill country esp on non-calcareous rocks: sparse in lowlands and absent from most of NE.

Wood speedwell
Veronica montana L.



Old deciduous woodlands and shady hedgebanks on damp loamy or clay soils, PN med, base med to rich, mod acid to calc, ½ shade to shade, sheltered. A characteristic member of the species-rich ground flora in ancient woodlands on heavy calcareous soils. Ass: *Geran rob, Oxali ace, Geum urb, Primu vul, Adoxa mos, Melic uni, Sanic eur, Lamia gal, Mercu per.*
Frequent in NW and S of region, except on acid rocks: sparse in N Shropshire plain.

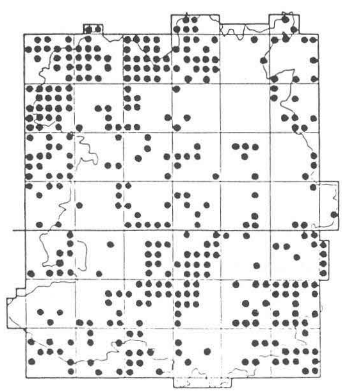
Germander speedwell
'Bird's eye', 'Eyebright'
Veronica chamaedrys L.
Hedgebanks, edges of woodland, open scrub, meadows and old pastures, on damp to dry loamy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, tolerant of grazing and of compet with all but the tallest grasses. Most typical of the transition zone between grassland and scrub. Ass: *Prune vul, Ranun fic, Vicia sep, Antho odo, Stell hol, Centa nig, Lotus cor, Festu rub, Alope pra.*
Frequent to abundant throughout region.

Spiked speedwell
$ **Veronica spicata** L. ssp. **hybrida** (L.) E.F. Warb.
Not in v c 40.
Bare rocky slopes, ledges and stable scree on dolerite outcrops, on v. shallow dry stony loam, PN poor to med, base med to rich, acid to neut, sunny, exposed, drought resistant. A member of the distinct rock-heath community at its only site in the region on Breidden Hill. Ass: *Erica cin, Callu vul, Helia num, Teucr sco, Hiera pel, Jasio mon, Aira pra, Teesd nud, Ornit per.*
V. rare: first found by Edward Lhwyd (see 2.3). Although the major site for this species was quarried away during the 1960s, it survives in at least two of its minor sites and has recently established itself on quarry spoil below the main workings.

Thyme-leaved speedwell
Veronica serpyllifolia L.
Pasture, lawns, grassy verges, grazed marsh and fen, on moist to damp sometimes seasonally dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, heavily grazed, tolerant of trampling but not of compet with tall grasses. A common weed of damp lawns. Ass: *Belli per, Trifo rep, Trifo dub, Prune vul, Plant lan, Hypoc rad, Festu rub, Luzul cam.*
Frequent throughout region.

Wall speedwell
Veronica arvensis L.
Bare patches in grassland and roadside banks, rock outcrops, fine scree, ant-hills and the tops of old walls, on thin dry humus or sandy or stony soil, PN poor to med, base med to rich, mod acid to calc, sunny, exposed, warm. A typical member of the pioneer annual community of shallow base-rich soils. Ass: *Aphan arv, Saxif tri, Arena ser, Aira car, Erodi cic, Myoso dis.*
Locally frequent throughout region.

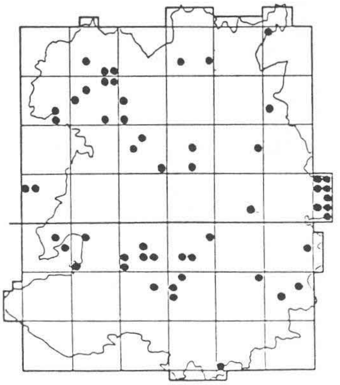
Ivy-leaved speedwell
Veronica hederifolia L.



Edges of arable fields, farmyards, disturbed verges, gardens, compost heaps, rubbish tips, on damp to dry soils, PN rich, base med, mod acid to neut, sun to ½ shade. A pioneer weed of bare ground on rich soils. Ass: *Veron per, Lamiu pur, Stell med, Polyg avi, Poa ann, Senec vul.*
Locally frequent or local throughout region but sparse in NE.
Ssp. **hederifolia**
Garden weed in Pant (1970 PMB); and in v c 47 on roadside at Gaerfawr Hill (1976 PMB).
Ssp. **lucorum** (Klett & Richter) Hartl.
(*V. sublobata* M. Fischer)
Garden weed in Pant (1970 PMB).

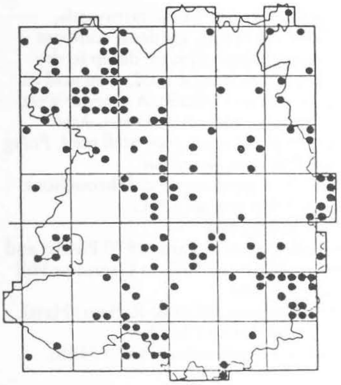
Common field-speedwell
***Veronica persica** Poiret
Arable fields, gardens, rubbish tips and disturbed ground, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny, a well established pioneer weed of v. fertile cultivated ground. Ass: *Polyg avi, Veron agr, Matri mat, Capse bur, Papav rho.*
First recorded near Oswestry some time before 1841 (LFS): now frequent to abundant throughout region except at highest altitudes.

Grey field-speedwell
Veronica polita Fries



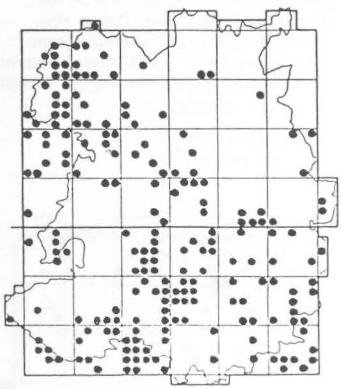
Cultivated fields and gardens on damp to dry but winter-wet, heavy soils, PN rich, base rich, neut to calc, sunny, warm. Ass: *Capse bur, Matri mat, Polyg avi, Polyg per, Tripl mar.*
Local and perhaps under-recorded in NW and S central parts of regions: sparse in W and NE: absent from most of hill country.

Green field-speedwell
Veronica agrestis L.
Open patches in cultivated ground and gardens, on dry sandy or loamy soils, PN med to rich, base med, mod acid to neut, sunny, exposed. Ass: *Arabi tha, Poa ann, Eupho pep, Medic lup, Plant maj, Veron arv, Veron per, Diplo mur.*
Commoner than *V. polita* esp in NW



and SE of region: apparently rare in Clun Forest and Clee Hills areas.

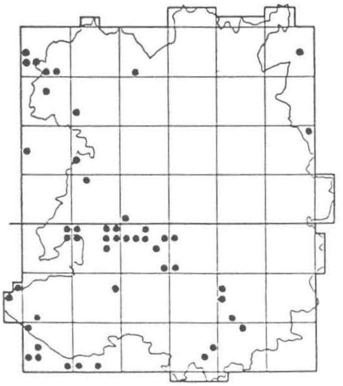
Slender speedwell
'(Everlasting) sin', 'Money'
*__Veronica filiformis__ Sm.



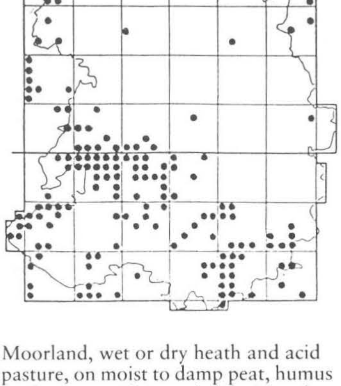
Lawns, stream banks, damp verges and other grassy places, on moist to damp, often poorly drained soils, PN med to rich, base med to rich, mod acid to neut, sun to ½ shade, favoured by heavy mowing or grazing and trampling under which it competes vigorously with native species of short turf. Apparently propagated entirely by vegetative means; fragments of shoots may be spread by the soles of gardeners' wellingtons. Ass: *Belli per, Ranun rep, Prune vul, Plant maj, Poa ann, Agros sto, Achil mil.*
Truly naturalised and frequent throughout region except intensive arable area in NE.
First recorded at Church Stretton in 1941.
The local name 'sin' was reported to one of the authors (CAS) in the early 1950s (see *TCSVFC* 1951–56, p70). Said to be so called because 'it is so attractive and so prevalent'.

Marsh lousewort, Red rattle
Pedicularis palustris L.

Fens, flushes and stream sides, valley mires with some lateral seepage of water in the soil and a variable water-table, on peat or clay, PN poor, base med to rich, acid to neut, sunny, tolerant of light grazing and trampling and commonest in short vegetation but will stand compet from all but the tallest fen species. An indicator of mobile ground water and a moderate supply of mineral nutrients. Ass: *Carex pcea, Carex ech, Calth pal, Myoso lax, Ranun fla, Juncu art, Carex pul.*
V. locally frequent in Oswestry uplands and W Central hills: sparse elsewhere in hill country: almost absent from plain.

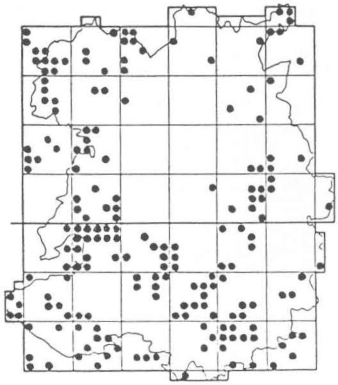


Lousewort
Pedicularis sylvatica L.



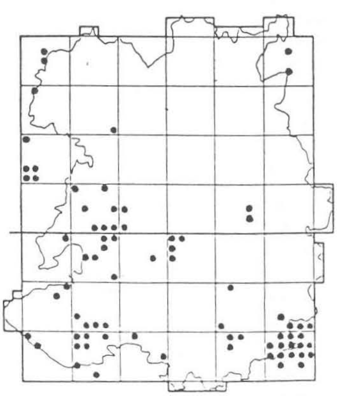
Moorland, wet or dry heath and acid pasture, on moist to damp peat, humus or clay, usu with impeded drainage but sometimes summer-dry, PN poor, base poor, acid, sunny, exposed, tolerant of grazing and trampling, but a poor competitor with taller plants. Ass: *Polyg ser, Veron off, Nardu str, Erica tet, Poten ere, Carex bin.*
Frequent in hill country on acid rocks esp in W Central hills and Clee hills areas: sparse to locally frequent elsewhere in uplands: v. rare in lowlands.

Yellow rattle
'Cockscomb', 'Rattlebox', 'Rattlers'
Rhinanthus minor L. agg.



Species-rich grassland, particularly old upland hay meadows where it can be strikingly abundant, on damp to dry loamy soils, PN poor to med, base poor to rich, acid to calc, sunny, open. A plant of rather impoverished soils but tolerant of moderate applications of NPK fertiliser. Tolerant of some disturbance but not of ploughing or heavy grazing. Ass: *Dacty fuc, Antho odo, Poten ere, Lotus cor, Cynos cri, Trifo pra, Ranun acr, Centa nig, Agros cap.*
The most characteristic upland hay meadow species: is frequent throughout the hill country but sparse in lowlands.
var. **minor** is widespread. var. **stenophyllus** Schur has been found in a field near Oswestry (1956 V Gordon).

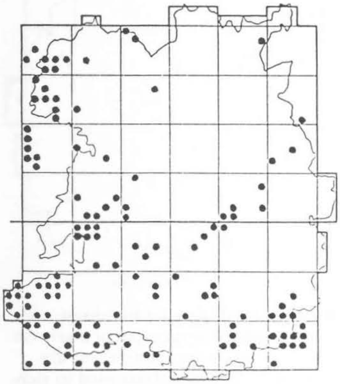
Common cow-wheat
Melampyrum pratense L.



Open moorland, heath and upland sessile oak woods, on dry to damp loams with a thick raw humus layer, often stony, PN poor, base poor, acid to mod acid, shade to ½ shade, cool. Ass: *Lathy mon, Solid vir, Hyper pul,*

Vacci myr, Luzul syl, Callu vul, Desch fle, Blech spi.
Locally frequent to abundant in W Central hills (Stiperstones) and SE (Wyre Forest): local elsewhere in hill country: v. rare in lowland.

Eyebright
Euphrasia officinalis L. agg.



Old pastures and meadows, heaths, quarry floors and mine waste, on damp to dry often stony shallow soils, PN poor, base poor to rich, acid to calc, sunny, open. A semi-parasite on grasses typically found in short grazed turf where it often exhibits a marked suppressor effect on the growth of grasses. All records cited have been checked or determined by PF Yeo.

Euphrasia rostkoviana Hayne
Ssp. **rostkoviana**
Batholes meadow, Hope (1962 CAS & FHP), ploughed and drained in 1964. Earlier records from Wyre Forest. In v c 43 at Whitterley's Farm near Knighton (1964 GPR).

Ssp. **montana** (Jord.) Wettst. was reported from v c 40 in 1945 – no details available.

Euphrasia anglica Pugsl.
Recorded from 4 Shropshire localities: Black Ven (1963 HHS); heathy bank E of Leintwardine (1967 SMW); field near Betchcott (1955 A Martin); marshy meadow, Harton, Wenlock Edge (1955 EMR). There are also records from the Breidden Hills in v c 47, and 6 from v c 43 in 1964/65 by GPR plus one in 1956 by FHP.

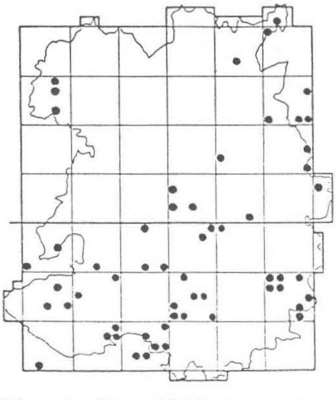
Euphrasia arctica Lange ex Rost. ssp. **borealis** (Towns.) Yeo
(*E. brevipila* auct.)
Small unimproved hay meadows and lead mine spoil-tips on dry stony soil, PN poor to med, base med, mod acid, sunny, tolerant of mowing and light grazing. Ass: *Festu rub, Leuca vul, Rumex aosa, Rhina min, Trifo pra, Plata chl, Botry lun.* V. locally frequent at Pennerley (1984 CAS). First v c 40 record near Oswestry (1956 V Gordon): also in v c 39 at Forton (1944 ESE); v c 43 Llangunllo (1956 FHP); v c 47 Brimford (PF Yeo).

Euphrasia nemorosa (Pers.) Wallr.
Hill grassland, esp on limestone, and on quarry floors and spoil-heaps. Under-recorded, but probably the commonest eyebright in both lowland and upland parts of region: Crickheath Hill; Whixall; Bridgnorth; Shelve Hill; Lilleshall Quarry, Wenlock Edge; Oreton Quarries; N of Bewdley; and in v c 39 at Forton.

Euphrasia confusa Pugsl.
Recorded in the Church Stretton area in 1922 and 1979; Wenlock Edge area in 1961; and at 5 localities in the extreme SW in 1964/65.

Euphrasia micrantha Reichenb.
One very old specimen from Dovaston Heath in **CGE** (1839); a later record from canal bank, Whixall (1936 RCL Burges).

Red bartsia
Odontites verna (Bellardi) Dumort.

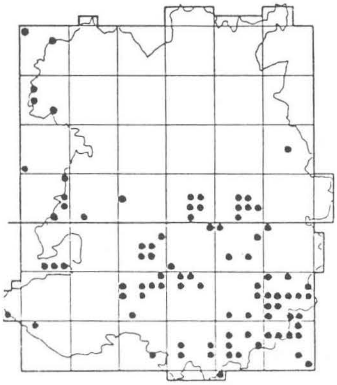


Edges of cultivated fields, gateways, disturbed ground on verges, bare patches in neglected grassland, on damp to dry usu winter-wet clay or loam soils, PN med, base med to rich, mod acid to calc, sunny, a species of open perennial weed communities not ploughed every year. Tolerant of some grazing but a poor competitor in closed vegetation.
Ssp. **verna**
Locally frequent in W, SW and centre of region.
Ssp. **serotina** (Dumort.) Corb
Locally frequent in SE and E of region.

Yellow bartsia
***Parentucellia viscosa** (L.) Caruel
A small group of about half a dozen plants of this rare southerly species have been found on the rubble of a broken-up airfield runway on Whitchurch Heath, on stony soil perhaps with impeded drainage, PN poor, base status uncertain, in an open community of perennial weeds. Ass: *Chame ang, Leuca vul, Ornit per, Centa nig, Agros cap, Holcu lan, Trifo rep.*
Very rare, first county record (July 1983 CW & WVP).

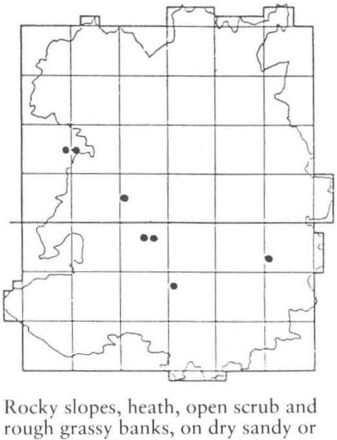
BROOMRAPE FAMILY OROBANCHACEAE

Toothwort
Lathraea squamaria L.



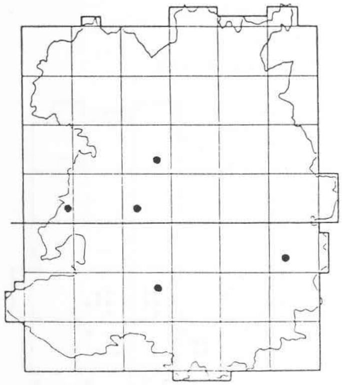
Woods and hedgebanks, on damp clay or loam, PN med, base med to rich, mod acid to calc, shaded to sunny. Often growing on its own at the base of trees, being parasitic on the roots of hazel, wych elm, sycamore and other trees and shrubs. Ass: *Mercu per, Primu vul, Oxali ace, Stell hol, Veron mon.*
Locally frequent on calcareous soils in centre and SE of region: sparse in W and absent from N plain.

Greater broomrape
Orobanche rapum-genistae Thuill.



Rocky slopes, heath, open scrub and rough grassy banks, on dry sandy or stony soils, PN poor to med, base poor, v. acid to acid, sun to ½ shade, warm, sheltered. A parasite on broom, gorse and other leguminous shrubs, seldom abundant or persistent in one place. Ass: *Cytis sco, Ulex eur, Ulex gal, Callu vul, Erica cin, Teucr sco.* Rare: Bridgnorth; Munslow Aston; NE end of Long Mynd; Earls Hill; Breidden Hills.

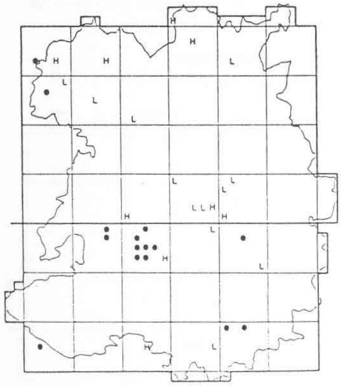
Common broomrape
Orobanche minor Sm.



Occasional and impersistent on roadsides and in gardens, parasitic on a variety of hosts including *Conium maculatum* at Shelton (1975 MJC); privet near Bridgnorth (1978 WEH); and clover at Church Pulverbatch (1981 AKT); also near Westhope.

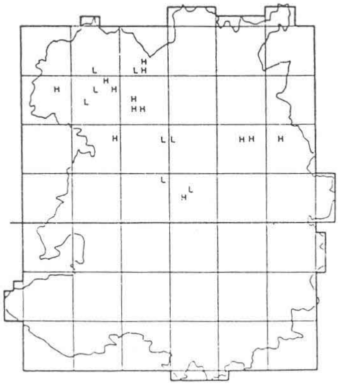
BUTTERWORT FAMILY
LENTIBULARIACEAE

Common butterwort
Pinguicula vulgaris L.



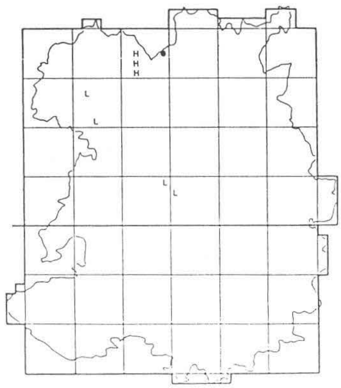
Flushes, dripping rocks, springs and bare patches in calcareous mires, on wet peat, mud or stony soil with a constantly seeping water supply, PN poor, base med to rich, acid to calc, sunny, sheltered, cool, tolerant of grazing and trampling but not of compet. Ass: *Anaga ten, Carex dem, Carex pul, Carex pcea, Juncu bul, Carex dio, Sagin nod.*
Formerly widespread in suitable habitats in lowland parts of region: now frequent only in Long Mynd and Stiperstones areas with scattered records elsewhere in hill country. Severe decrease due to agricultural improvements in wetlands.

Greater bladderwort
†Utricularia vulgaris L. agg.



Probably extinct.
Recorded for SJ 43 in *ABF* but not seen during the present survey. Most records in *LFS* and *HFS* (esp in NW of Shropshire plain) lost through changes in land use and land drainage.
U. vulgaris s.s. was recorded in a bog near Welshampton (1881 Beckwith).
U. australis R. Br. (*U. neglecta* Lehm.) was found in 1842 at Seaman's Moss Pits (a lost site on SJ51).

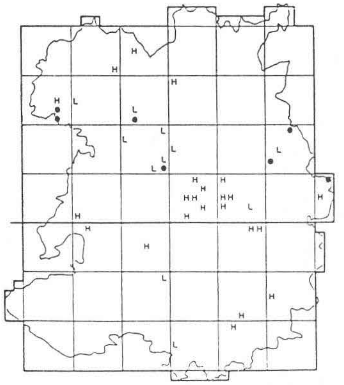
Lesser bladderwort
Utricularia minor L.



Shallow acid pools on peat bogs, often in old peat cuttings.
V. rare; still surviving in a small area on Whixall Moss: lost from other localities near Ellesmere; West Felton; and Shrewsbury.

VERBENA FAMILY
VERBENACEAE

Vervain
***Verbena officinalis** L.

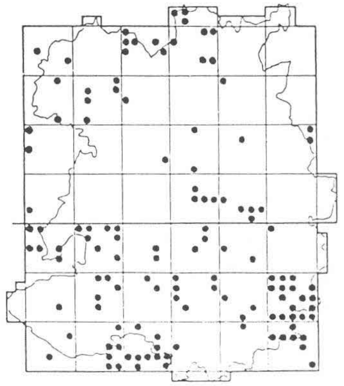


Waste ground, derelict buildings, old walls, roadside verges, particularly on limestone or mortar rubble, on dry stony soils, PN med, base med to rich, mod acid to calc, sunny, warm. Intolerant of grazing, frequent mowing or compet with vigorous grasses and not persisting long in one place. Ass: *Ballo nig, Bromu ste, Daucu car, Lamiu alb, Sisym off, Urtic dio.*
Rare and sporadic in scattered localities across plain from Llanymynech to Newport and Boscobel. Formerly frequent between Shrewsbury and Much Wenlock. Once found in most parts of region, through the records span a longer period of time than the present survey.

MINT FAMILY
LABIATAE

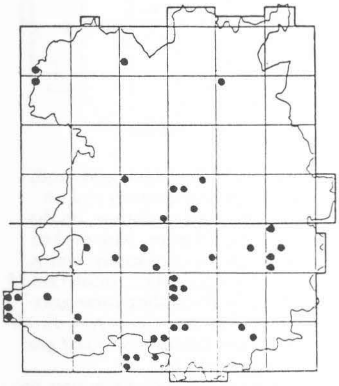
Pennyroyal
Mentha pulegium L.
Reported from a bog near Gorstley Wood (1977 CR); and from Middle Pool, Steadvallets (1979 TEM), but requiring confirmation.

Corn mint
Mentha arvensis L.



Edges of damp cultivated fields and disturbed ground, on wet to damp intermittently flooded soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, a vigorous colonist but a poor competitor. Ass: *Myoso lax, Agros sto, Galium pal, Veron scu, Poten ans.*
Locally frequent in Ludlow area and Lower Severn Valley: local elsewhere in region.

Whorled mint
Mentha × verticillata L.
(*M. aquatica × arvensis*)



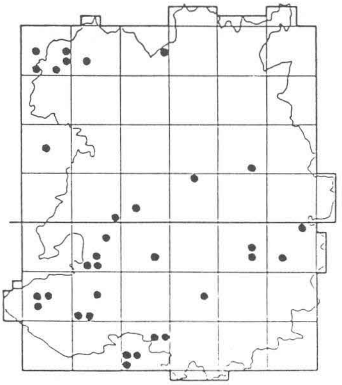
Edges of ponds, pools, streams, slow rivers and canals, marshy hollows in fields and woodland edges, on wet to damp often flooded soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, tolerant of trampling and infrequent mowing but not of grazing or compet with tall grasses. Ass: *Myoso lax, Ranun fla, Prune vul, Ajuga rep, Menth aqu, Galiu pal.*
Locally frequent esp in S of region. Commonest hybrid mint, but probably under-recorded.

Water mint
Mentha aquatica L.

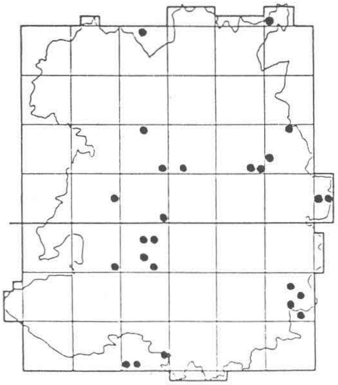
Edges of pools, ponds, canals, slow rivers, streams and in ditches, marshy hollows, wet margins of fields, in shallow standing water, still or slow flowing, or on wet to moist mud or peaty soil, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered. Tolerant of trampling and occasional mowing but not of heavy grazing. Ass: *Lycop eur, Calth pal, Lychn flo, Myoso sco, Galiu pal, Alism pla, Berul ere.*
Frequent to locally abundant throughout region.

Peppermint
***Mentha × piperita** L.
(*M. aquatica × spicata*)

Well established and naturalised on banks of streams, rivers, canals, ponds and in ditches, on wet to moist soils, PN med to rich, base med to rich, mod acid to calc, sunny. Usu a garden escape but may also arise spontaneously.
Locally frequent in SW and NW of region: sparse elsewhere.

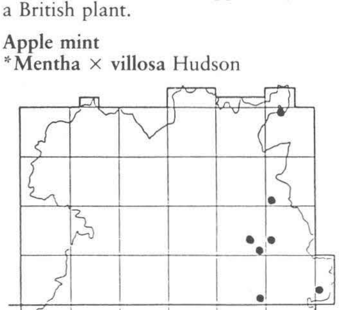


Spear mint
***Mentha spicata** L.
(*M. viridis* auct.)



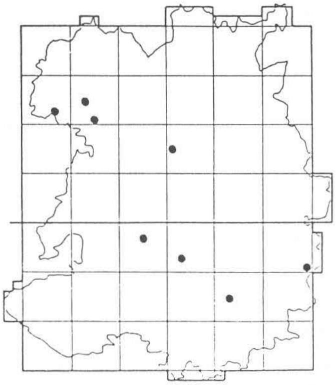
Edges of tracks and roads, wet quarries, waste ground, banks of streams and pools. Very commonly cultivated and probably always a garden escape where it occurs in the wild.
Rather local, mainly in S half of region. Hairy forms of *M. spicata* have been recorded as *M. longifolia* (L.) Hudson (Horse mint), which is apparently not a British plant.

Apple mint
***Mentha × villosa** Hudson
(*M. spicata × suaveolens*) (incl. *M. niliaca* auct., *M. cordifolia* auct. and *M. alopecuroides* Hull)



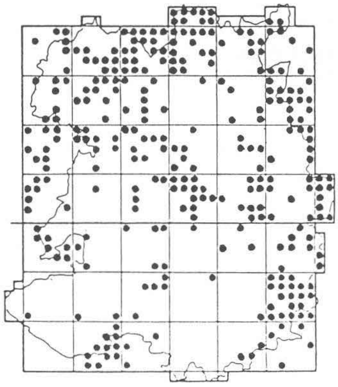
Well established in former gardens and on waste ground and roadside banks in a few places in the E of region.

Round-leaved mint
***Mentha suaveolens** Ehrh.
(*M. rotundifolia* auct., non (L.) Hudson)



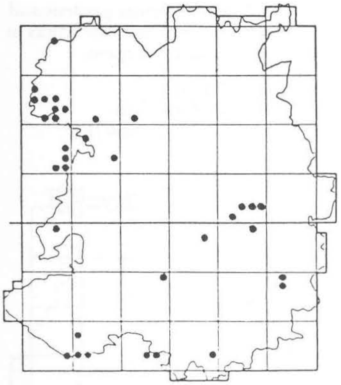
Garden escape well established on roadsides and waste ground, in a few scattered lowland localities.

Gipsywort
Lycopus europaeus L.



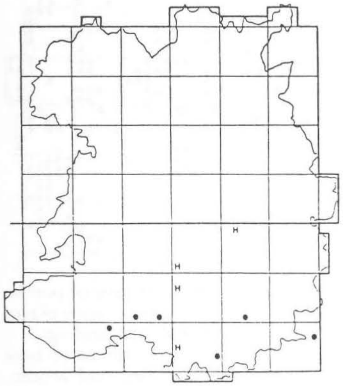
Reed beds, swamp, margins of ponds and streams, canal banks, open places in alder carr, in shallow standing water, slow flowing or still, or on bare peat or organic mud, wet and winter-flooded, PN rich, base rich, neut to calc (alk), ½ shade or sunny, sheltered, flood tolerant but sensitive to trampling or grazing and compet with more vigorous waterside plants. A pioneer species of nutrient rich lowland water margins. Ass: *Phala aru, Glyce max, Sparg ere, Scute gal, Menth aqu, Solan dul.*
Frequent throughout lowland parts of region and wider valleys in hill country but absent at higher altitudes.

Marjoram
Origanum vulgare L.



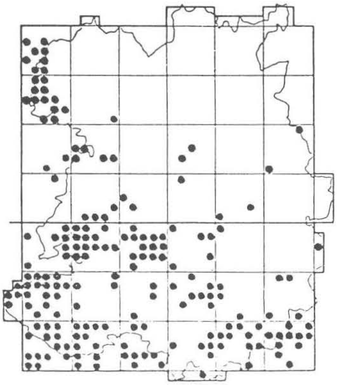
Tall herb swards, grassy banks, open scrub and woodland edges esp on limestone, on dry stony soils, PN poor, base rich, mod acid to calc, sun to ½ shade, warm, sheltered, intolerant of grazing, mowing or trampling. A strong competitor with smaller plants, often forming extensive patches. A characteristic member of the rich herb community on sunny margins of limestone scrub. Ass: *Hyper hir, Hyper pul, Clino vul, Teucr sco, Fraga ves, Brach syl, Arrhe ela.*
Locally frequent in Oswestry uplands (limestone); Breidden (dolerite); Wenlock Edge (limestone): sparse elsewhere in W and S.

Large thyme
Thymus pulegioides L.



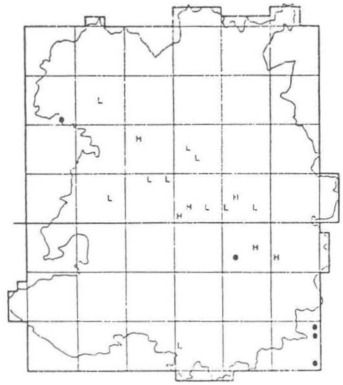
Dry banks on limestone and in open grassland, tracks and old limestone walls, on dry stony soils, PN poor, base rich, calc, sunny, warm, in open communities with little compet. Ass: *Shera arv, Geran col, Cardu nut.*
Sparse: confined to extreme S of region. Formerly extending further N on Wenlock limestone outcrop.

Wild thyme
Thymus praecox Opiz ssp. **arcticus** (Durand) Jalas
(*T. drucei* Ronniger)



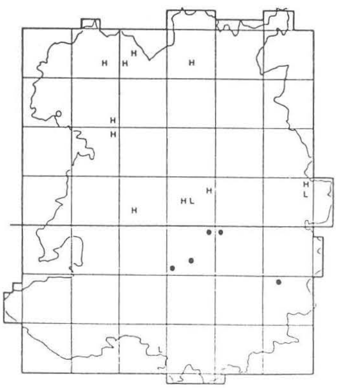
Open short species-rich grassland, dry limestone banks, bare outcrops of other basic rocks and screes, on dry shallow stony or sandy soils, PN poor, base med to rich, mod acid to calc, open, sunny, warm, tolerant of grazing and often forming pure dense mats in suitable places, although intolerant of compet with taller plants. Survives some root disturbance and is characteristic of warm S end of ant-hills in grassland. Ass: *Veron off, Hiera pil, Festu ovi, Helia num, Carex car, Sangu min, Aphan arv, Veron cha, Galiu ver, Linum cat.*
Frequent in most parts of hill country and Lower Severn Valley: sparse in lowland and absent form much of N.

Wood calamint
Calamintha sylvatica Bromf.
ssp. **ascendens** (Jordan) P.W. Ball



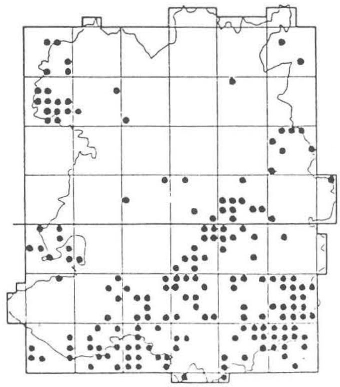
Dry banks and verges and old limestone quarries.
The only Shropshire record is from Netchwood (1974 DS & FHP): also found on Llanymynech Rocks in v c 47; near Giants Head (1977 EDP); and at three sites in v c 37. Formerly common in S half of N Shropshire plain.

Basil thyme
Acinos arvensis (Lam.) Dandy



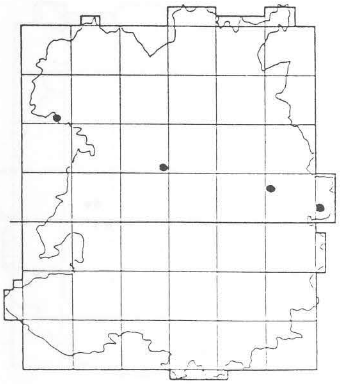
Bare patches in limestone grassland, rock outcrops and quarries and on banks of lime-rich sandstone, on dry shallow soils, PN poor, base med to rich, mod acid to calc, sunny, warm, exposed. A pioneer plant, intolerant of compet but withstanding some grazing. Ass: *Aphan arv, Ceras sem, Erodi cic, Eroph ver, Geran mol, Saxif gra, Myoso ram, Valer loc.*
Rare: now restricted to a few sites on Wenlock Edge and near Eardington Station: also on Llynclys Hill in the 1950s. Formerly widespread in the N Shropshire plain.

Wild basil
Clinopodium vulgare L.



Verges, hedgebanks and open scrub on limestone and other base-rich rocks, on dry stony and loamy soils, PN poor to med, base med to rich, mod acid to calc, sunny and warm, intolerant of grazing. Typical but infrequent in marginal tall-herb community between woodland and grazed or trampled turf. Ass: *Origa vul, Hyper hir, Agrim eup, Galiu cru, Arrhe ela.*
Frequent in Oswestry uplands (limestone); and SE: sparse elsewhere.

Balm
*Melissa officinalis L.

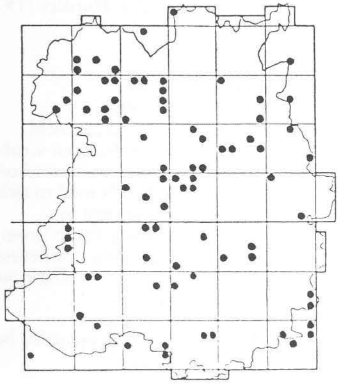


Garden weed escaping onto roadsides in a few localities in N Shropshire.

Wild clary
† **Salvia verbenaca** L.
(*S. horminoides* Pourret)
Probably extinct, but several old records in *LFS* and *HFS* (see Chapter 2).

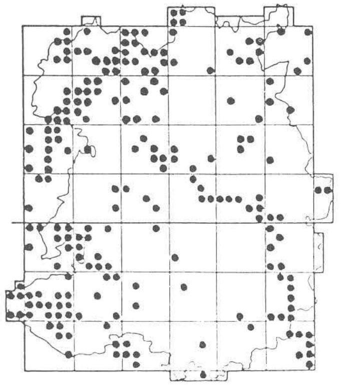
Selfheal
Prunella vulgaris L.
Old pastures, lawns, verges, meadows, fens, open scrub, woodland rides, on damp to dry often poorly drained clay or loamy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, tolerant of heavy grazing and trampling. One of the most widespread weeds of short turf. Ass: *Plant lan, Trifo rep, Belli per, Hypoc rad, Lotus cor, Ranun rep.*
Frequent to abundant throughout region.

Field woundwort
Stachys arvensis (L.)L.

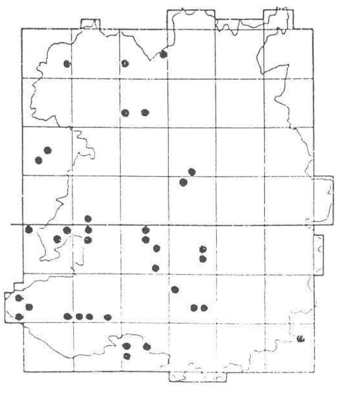


Arable fields esp with root and leaf crops, waste ground, new roadside verges, on damp often winter-wet clay or loamy soils, PN med to rich, base poor to med, mod acid, sunny. An old arable weed of poor soils. Ass: *Aethu cyn, Agros gig, Aphan arv, Capse bur, Poa ann, Stell med, Urtic ure, Veron hed.*
Locally frequent in arable areas throughout region, but decreasing.

Marsh woundwort
Stachys palustris L.

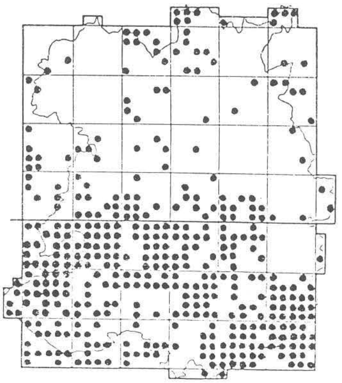


Banks of rivers and canals, hollows in species-rich meadows, on moist to damp intermittently flooded and poorly drained soils, PN med, base med to rich, mod acid to calc, sunny, sheltered. Flourishes in tall-herb communities but intolerant of frequent grazing or mowing. Ass: *Lycop eur, Iris pse, Lythr sal, Scrop aur, Carex otr, Phala aru.*
Frequent along canal, Severn and other major rivers: scattered elsewhere but absent from higher hills.
The hybrid **S × ambigua** Sm. (*palustris × sylvatica*) has been recorded from many scattered sites in W half of the region.



Hedge woundwort
Stachys sylvatica L.
Edges of woodlands and scrub, hedgebanks, waste ground, rubbish tips, field edges, on damp to dry soils, PN rich, base med to rich, mod acid to calc, ½ shade, sheltered, a strong competitor often forming large patches but intolerant of mowing or grazing. Ass: *Urtic dio, Rumex san, Allia pet, Glech hed, Galiu apa, Mercu per, Lapsa com.*
Frequent throughout region except at highest altitudes.

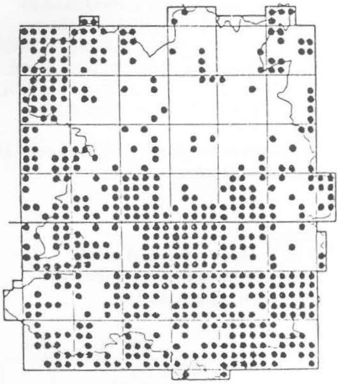
Betony
'Kill butcher', 'Ragged nettle'
Stachys officinalis (L.) Trevisan
(*Betonica officinalis* L.)



Open woods, scrub, hedgebanks and old species-rich pastures and meadows, on moist to dry, stony, sandy or loamy soils, PN poor to med, base med, mod acid to neut, sun to ½ shade. A characteristic member of the rich upland hay meadow community. Ass: meadow – *Primu ver, Succi pra, Pimpi sax, Centa nig, Campa rot;* Woodland edge – *Lonic per, Stell hol, Lathy mon, Antho odo, Desch fle, Hyper pul, Solid vir.*
Frequent in S half of region: locally frequent to sparse in N and absent from four 10km squares.

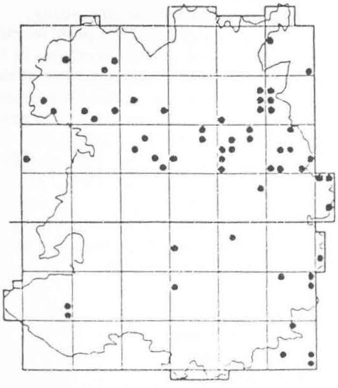
Black horehound
'Stinking Roger'
Ballota nigra L.
Disturbed ground on roadside verges, rubbish tips, farmyards, wasteland near buildings, edges of fields, on dry soils, PN rich, base med to rich, mod acid to calc, sunny, warm, sheltered. A member of the thermophilous weed community often associated with habitations. Ass: *Lamiu alb, Lamiu pur, Bromu ste, Lapsa com, Sisym off, Horde mur.*
Frequent in lowlands: rather local in hill country and avoiding highest altitudes.

Yellow archangel
Lamiastrum galeobdolon (L.) Ehrend. & Polatschek
(*Galeobdolon luteum* Hudson)



Old broad-leaved woods, dingles and shady hedgebanks, on damp, poorly drained clay or loam soils, PN med, base med to rich, mod acid to calc, ½ shade to shade, sheltered. Spreading by stolons to form fairly extensive patches, intolerant of grazing. Ass: *Ajuga rep, Geum urb, Carex syl, Hyaci non, Anemo nem, Campa tra.*
Frequent throughout the base-rich clay woodland area of the S and NW: becoming sparse in hill country on acid rocks and in NE lowland.

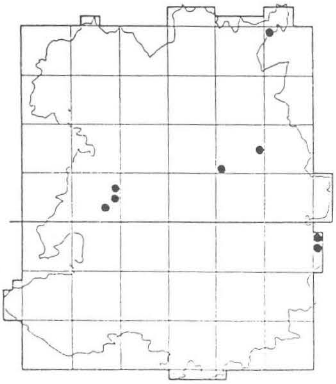
Henbit dead-nettle
Lamium amplexicaule L.



Gardens, rubbish dumps, arable fields esp with root and leaf crops, on light dry to damp, usu sandy soils, PN rich, base poor to med, mod acid to neut, sunny, warm. A rather common member of the pioneer annual horticultural weed community. Ass: *Arabi tha, Capse bur, Cheno alb, Elymu rep, Matri rec, Polyg avi, Senec vul, Thlas arv, Tripl ino, Urtic ure.*
Locally frequent in lowlands, esp NE: sparse in hill country.

Northern dead-nettle
$ ***Lamium molucellifolium** Fries
Not in v c 40.
Recorded from a grassy mound in an arable field near Welshpool (1982 C Small & EDP).

Cut-leaved dead-nettle
Lamium hybridum Vill.

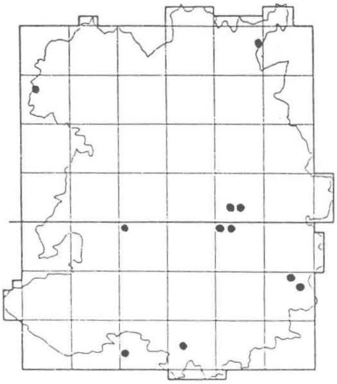


Edges of arable fields, trackways and disturbed ground, on dry soils, PN rich, base med to rich, mod acid to calc, sunny. A pioneer weed of cultivation.
Recorded from a few localities in the N and E lowlands.

Red dead-nettle
'Dun nettle', 'French nettle', 'Rabbit's meat'
Lamium purpureum L.
Cultivated ground, field edges, disturbed verges, farmyards, wasteland, gardens, on damp to dry loam or clay soils, PN rich, base med to rich, mod acid to calc, sunny, warm. A common colonist of fertile disturbed soils. Ass: *Lamiu alb, Galiu apa, Stell med, Poa ann, Plant maj, Ballo nig.*
Frequent throughout lowlands: more local in hill country.

White dead-nettle
'Dead-nettle'
Lamium album L.
Hedgebanks, verges, waste ground, rubbish tips, farmyards, track sides and gardens, mainly associated with habitations, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny, sheltered, intolerant of grazing or mowing. A common member of the vigorous tall-herb community on rich lowland soils. Ass: *Lamiu pur, Cheli maj, Elymu rep, Rumex obt, Urtic dio, Ranun rep, Galiu apa.*
Frequent throughout lowland: sparse in hill country and absent from higher altitudes.

Spotted dead-nettle
***Lamium maculatum** L.



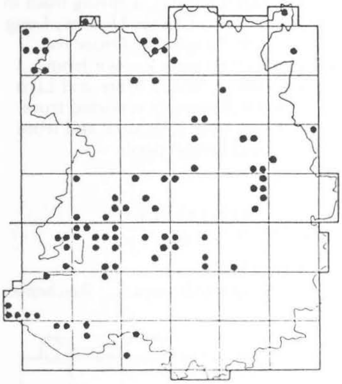
Garden escape established on road verges and hedgebanks and in gateways, on dry to damp loam, PN med to rich, base med, neut.
Scattered throughout region but rare, with small concentration in Benthall area.

Motherwort
***Leonurus cardiaca** L.
Naturalised by rocky woodland rides, track-sides, open scrub and verges on dry stony loamy soils, PN rich, base med, mod acid, sun to ½ shade, warm, sheltered, ungrazed.
Long known below rocks in valley between Burcote and Rindleford (seen 1976 WEH); mentioned at Birchley Farm, Rudge in *The Wandering Worfe* (Robinson 1980). Recorded in *LFS* from Morfe and Linley near Bridgnorth. Once reported from Baschurch. In v c 47 at Plas Derwen, Llansantffraid; canal between Wern and Red Bridge; former cottage by lane up Breidden (Hignett and Lacey 1977).

Red hemp-nettle
$**Galeopsis angustifolia** Ehrh. ex Hoffm.
Not in v c 40.
Small patch in wood at Hurdley (1976 EW).

Common hemp-nettle
Galeopsis tetrahit L. agg.
Disturbed ground on verges, field edges, margins of woods, open scrub, bracken covered slopes and wasteland, on damp to dry soils, PN med to rich, base med, acid to neut, sun to ½ shade, tolerates some shade (from bracken), but not a strong competitor. Ass: *Chame ang, Galiu apa, Digit pur, Lapsa com, Allia pet.*
Frequent throughout region.
G. bifida Boenn has been recorded but not consistently mapped.

Large-flowered hemp-nettle
Galeopsis speciosa Miller



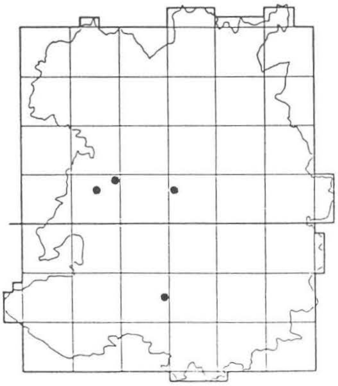
Cultivated ground, often near farmsteads, verges, banks, rubbish tips, wasteland, on damp peaty or loamy soils, PN rich, base med, mod acid to neut, sunny, warm, exposed. Ass: *Polyg per, Matri mat, Atrip pat, Thlas arv, Capse bur, Veron per.*
Associated with 'traditional arable farming' esp in hills, but quickly eliminated by modern methods of cultivation and weed control.
Locally frequent in W Central hills; Clun Forest; Oswestry uplands; and N Shropshire Mosses: sparse elsewhere and absent from much of SE.

Cat-mint
*** **Nepeta cataria** L.
Casual on verges, hedgebanks and waste ground.
Reported from lane near Culmington (1977 HH); near Knowbury (1982 RR); and formerly from the site of Viroconium (1962 CAS).

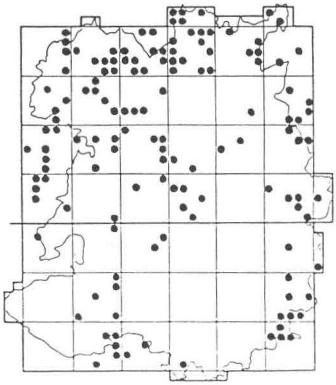
Ground-ivy
'Ale-hoof', 'Robin-run-i'-the-'edge'
Glechoma hederacea L.
Woods, scrub, hedgerows, verges, ditch-banks, gardens, rubbish tips, wall-tops, on damp to dry soils, PN rich, base med to rich, mod acid to neut, ½ shade to shade, sheltered. Occasionally in full sunlight where it flowers more freely, creeping extensively over fertile soil on shaded sites, often as an understorey to nettle or other taller species. Ass: *Urtic dio, Galiu apa, Poa tri, Geum urb, Ranun fic, Ranun rep, Geran rob, Brac ruta.*
Widespread throughout region.

White horehound
***Marrubium vulgare** L.
Probably not native in this region but occasionally naturalised and persistent on dry banks, roadside verges and in gardens.
Rare: Stony Stretton; Edge; Aston Rogers; Alcaston; Priestweston. Formerly known at Boreton Bank on the Cound Brook (1955 EMR).

(Map: next column)



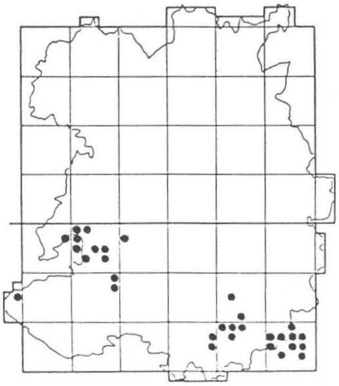
Skullcap
Scutellaria galericulata L.



Wet meadows, marshy hollows in fields, reed beds by pond margins, banks of streams and canals in shallow water, on wet to damp intermittently flooded mud or clay, PN med, base med, mod acid to neut, sun to ½ shade, sheltered and usually overshadowed by taller waterside plants. Tolerant of light grazing. Ass: *Glyce max, Solan dul, Filip ulm, Lycop eur, Cicut vir, Carex amis, Iris pse.*
Frequent in NW of region and Lower Severn Valley: frequent elsewhere in lowlands but absent from much of hill country.

Lesser skullcap
Scutellaria minor L.
Flushes, springs, valley mires and boggy ground in the hills, often beside streams, ditches or ponds, on wet peaty or clay soils with impeded drainage and a trickling water supply, PN poor, base poor to med, acid to mod acid, sunny, sheltered, cool. Ass: *Viola pal, Hydro vul, Myoso sec, Carex ech, Carex dem, Isole set, Juncu bul, Anaga ten, Epilo pal, Galiu pal.*
V. locally frequent in Corndon area; Norbury; Catherton Common and Clee Hill; Wyre Forest. Mainly an upland plant in this region.

(Map: next column)



Wall germander
†*Teucrium chamaedrys L.
Extinct?
Formerly long established on ruined walls at Wenlock Abbey; the keep at Whittington Castle; and the limestone quarries at Oreton.

Wood sage
Teucrium scorodonia L.
Open scrub, rocky banks, stable screes, stone walls and steep hedgebanks, woodland margins, rides and clearings, heathland and disturbed ground, on dry infertile soils, PN poor, base med, acid to neut, generally avoiding extremes of acidity and alkalinity. A common and characteristic member of the short-herb community transitional between grassland and scrub, also an important colonist of scree, which it helps to stabilise with its deep and extensive rhizome system. Very tolerant of drought, fire, grazing, trampling and of a wide range of light and shade but a poor competitor with the most vigorous grasses. Ass: *Agros cap, Cytis sco, Hyper pul, Jasio mon, Callu vul, Hypoc rad, Digit pur, Umbil rup, Galiu sax, Luzul cam, Lathy mon.*
Locally frequent in suitable habitats throughout region, though uncommon on limestone and in arable NE.
LFS describes the whole plant as being "glutinous and of an aromatic bitter odour, similar to that of hops."

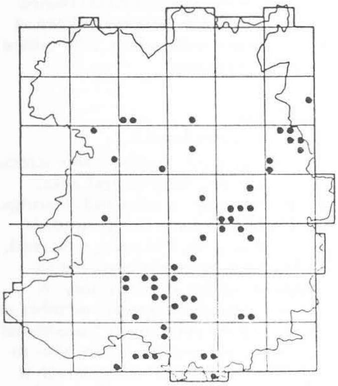
Bugle
Ajuga reptans L.
Woodland rides, glades and margins, ditch banks, damp hollows in fields and lawns, on wet to damp poorly drained and winter-wet, usu clay soils, PN med, base med to rich, mod acid to neut, ½ shade to shade, sheltered, humid, cool, creeping extensively over damp ground by streams in woods and tolerant of some grazing in the open, but a poor competitor with taller grasses. Ass: *Carex rem, Festu gig, Carda fle, Primu vul, Lychn flo, Calth pal, Ranun fla.*
Locally frequent throughout region.

PLANTAIN FAMILY
PLANTAGINACEAE

Greater plantain
Plantago major L.

Pastures, edges of cultivated fields, gateways, verges, paths, old railway tracks, pond edges, rubbish tips, waste ground, farmyards, on wet to dry trampled and compacted clay or loamy soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade, exposed. A characteristic member of the pioneer community of heavily trampled and v. fertile heavy soils and of mud or reservoir margins. Ass: *Poa ann, Polyg avi, Matri mat, Capse bur, Belli per.*
Widespread throughout region.

Hoary plantain
Plantago media L.

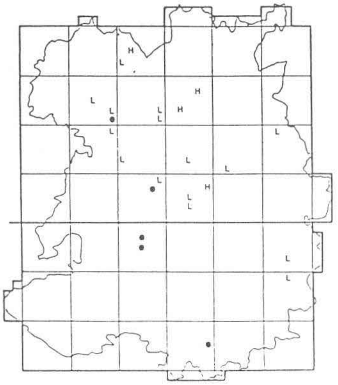


Old species-rich pasture and in well-established turf in limestone quarries and on spoil tips, on dry but sometimes winter-wet shallow, stony soils, PN poor to med, base rich, neut to calc, sunny, warm, tolerant of heavy grazing and trampling but a poor competitor with taller grasses. Ass: *Anaca pyr, Primu ver, Carex fla, Linum cat, Briza med, Festu ovi, Bromu ere, Leont his.*
Commonest on the limestone but by no means confined to it. Locally frequent from Ironbridge to Ludlow: rare elsewhere and surprisingly absent from Oswestry uplands as well as most other parts of the hill country.

Ribwort plantain
'Fighting cocks'
Plantago lanceolata L.

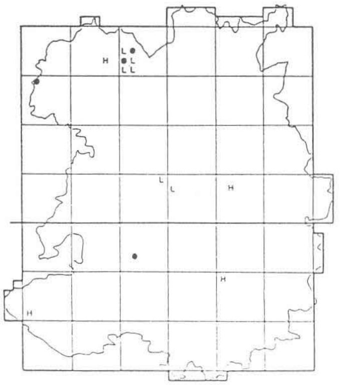
Pastures and meadows, verges and hedgebanks, open scrub, paths, waste ground, on damp to dry soils, PN poor to rich, base med to rich, acid to calc, sun to ½ shade. V. tolerant of heavy grazing and trampling (one of the most persistent weeds of over-grazed pasture), but capable of elongating its leaves upwards to keep pace with the most vigorous grasses and only slowly shaded out by the growth of shrubs and trees. Ass: *Festu rub, Agros cap, Cynos cri, Trifo rep, Hypoc rad, Tarax off, Prune vul.*
Frequent to abundant throughout region.

Buck's-horn plantain
Plantago coronopus L.



Bare open trampled places, on shallow often stony or sandy dry soils, PN poor, base poor to med, v. acid to mod acid, sunny, warm, exposed. Tolerant of v. heavy trampling and of salt.
Ass: *Rumex alla, Hypoc rad, Poa ann, Agros cap, Festu ovi.*
Formerly widespread in lowland, mainly on heaths which have since been agriculturally improved, now surprisingly rare but perhaps overlooked: recently from Lyth Hill (1976 ATH); top of The Cliffe (1982 CAS); Titterstone Clee old quarries (1983 ICT); Cardingmill Valley (1981 HMD & FHP); Worsley near All Stretton (1981 HMD).

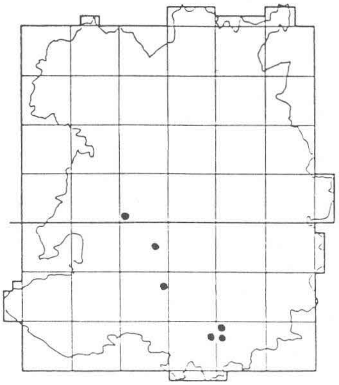
Shoreweed
Littorella uniflora (L.) Ascherson



Shallow margins of pools and meres, rooted in stones or sand in clear water, PN poor to med, base poor to rich, acid to neut, typically forming a single-species sward in the marginal zone of the shoreline exposed when water level falls during dry summers. Ass: *Elati hex, Juncu bul.*
Recently recorded (1983 JR) from a most unusual habitat, a spring flush in the upper part of Ashes Hollow, Long Mynd, with *Anaga ten, Drose rot.* Otherwise now only known from Newton Mere, White Mere and Llyn Rhuddwyn. Formerly reported from other meres near Ellesmere and from Bomere and Betton pools.

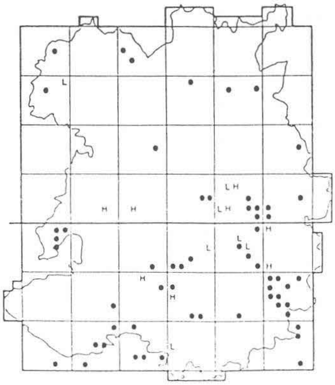
BELLFLOWER FAMILY
CAMPANULACEAE

Ivy-leaved bellflower
Wahlenbergia hederacea (L.) Reichenb.



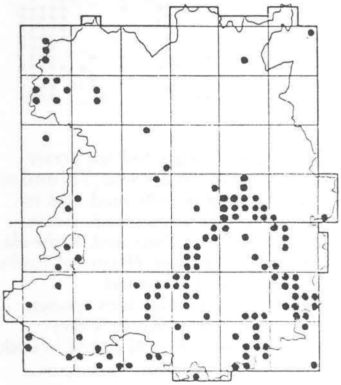
Flushes, streams and damp hill grassland, on wet to damp often peaty soils, with trickling water supply, PN poor, base poor, mod acid, sunny, sheltered, cool, straggling among taller plants and persisting surprisingly under conditions of intensive compet. Ass: *Scute min, Anaga ten, Carex dem, Juncu eff, Lotus uli, Sagin pro, Carex ech, Juncu art, Poly comm, Spha recu.*
V. rare: Titterstone Clee; Long Rough, Cothercott; Caer Caradoc (1922 *RBF*); Bishops Covert, Diddlebury (1922 *RBF*).

Giant bellflower
Campanula latifolia L.



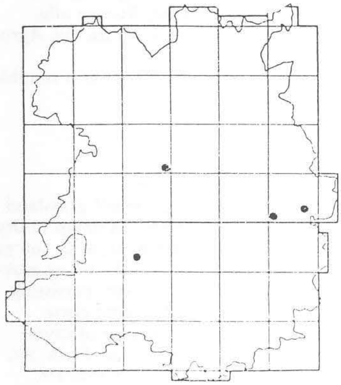
Woodland rides, glades and margins shady hedgebanks and river sides, on damp to dry soils, PN med, base med to rich, mod acid to neut, ½ shade, sheltered, intolerant of grazing or trampling. A typical though uncommon member of the tall-herb community of woodland edges. Ass: *Urtic dio, Bromu ram, Festu gig, Stach syl, Mercu per, Arcti min.*
V. locally frequent in Bridgnorth area; Lower Severn Valley; mid Wenlock Edge; and around Ludlow: rare elsewhere.

Nettle-leaved bellflower
'Blue foxglove'
Campanula trachelium L.



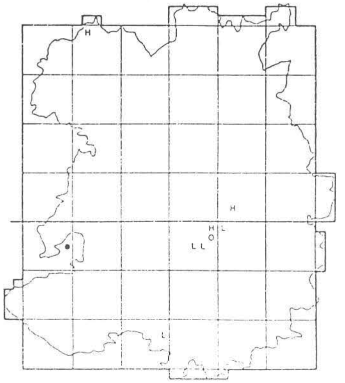
Woodland edges and rides and shady hedgebanks, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, ½ shade. Generally in long established herb-rich communities on margins of old woodland. Ass: *Galiu odo, Sanic eur, Anemo nem, Scrop nod, Allia pet, Carex syl, Festu gig.*
Frequent along Wenlock Edge from Ironbridge to Craven Arms and on edges of Clee hills platform: locally frequent in Oswestry uplands: sparse elsewhere in hill country and in N Shropshire plain.

Creeping bellflower
***Campanula rapunculoides** L.



Occasionally naturalised on roadside verges not far from gardens.

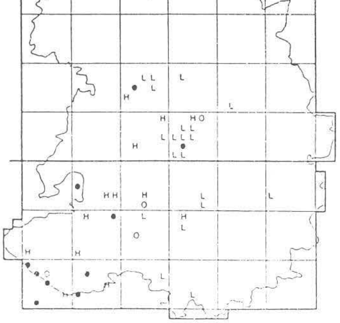
Clustered bellflower
$**Campanula glomerata** L.



Not in v c 40.
Woodland margins, hedgebanks and tall grassland, on dry calcareous soils. Formerly recorded from several sites along Wenlock Edge and near Ludlow but now apparently extinct in Shropshire and known only in a wild garden at Hurdley near Church Stoke (1976 EW).

Harebell
Campanula rotundifolia L.
Old pastures, meadows, grassy verges and hedgebanks, rocky slopes, heathland and open scrub, on damp to dry soils, PN poor, base poor to rich, acid to calc, sunny, exposed, tolerant of grazing and trampling but not of compet with more vigorous grasses. Ass: *Festu ovi, Agros cap, Galiu ver, Stach off, Viola riv, Thymu pra, Hiera pil, Callu vul.*
Frequent in suitable habitats throughout region.

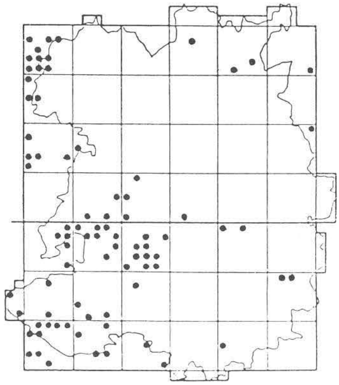
Spreading bellflower
Campanula patula L.



Disturbed ground on grassy banks by rivers or roads, edges of fields, open woodland or scrub, green lanes, on dry sandy, stony or loamy soils, PN poor, base med, mod acid to neut, sunny, warm, intolerant of grazing. A plant of species-rich but rather open communities favoured by disturbance such as road widening or land slips, not surviving long in compet with more vigorous and taller plants though tolerating partial shade for a time. Ass: *Poa nem, Centa ery, Vicia tet.*
V. locally frequent in Clun Forest (mainly Teme Valley): rare elsewhere. Much reduced over past half century by agricultural improvements esp use of fertilisers.

Venus's-looking-glass
†**Legousia hybrida** (L.) Delarbre
(*Specularia hybrida* (L.) DC.)
Extinct?
A former cornfield weed and garden escape. Recorded from Buildwas; Eaton Mascott; Wenlock; Benthall; Morville and Nash.
Most recent records, both by EMR, (1955) Stretton Westwood "in quantity in arable field among the growing corn, on E side of road B 4371 [SO]593982"; and (1961) "stubble-field, Easthope, alongside main road."

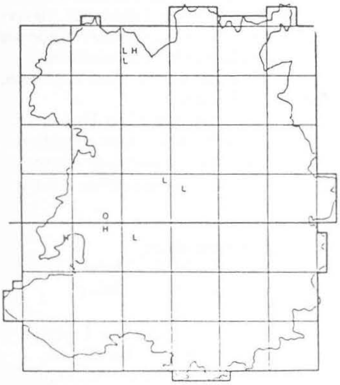
Sheep's-bit
Jasione montana L.



Rocky hillsides, stable screes, open patches on grassy banks and edges of woodland, on dry shallow stony or sandy soils, PN poor, base poor to med, acid to mod acid, sunny, warm, exposed, tolerant of trampling, grazing and drought but a poor competitor with taller plants though it will stand partial shade for a time. A typical but inconstant member of the post-pioneer stage colonising bare stony ground: its occurrence on a broken up runway on Whitchurch Heath underlines this role. Ass: *Hiera pil, Festu ovi, Desch fle, Poten ere, Teucr sco, Rumex alla, Aira pra.*
Locally frequent in W Central hills and other upland parts of W of region: absent from limestone and from most of lowlands and SE.

LOBELIA FAMILY
LOBELIACEAE

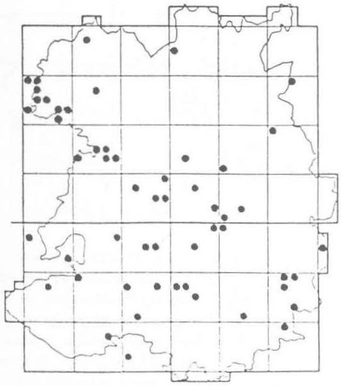
Water lobelia
†Lobelia dortmanna L.



Extinct.
A plant of rather shallow water in nutrient-poor lakes and pools. Formerly recorded from several Shropshire meres: Bomere; Berrington; Blake Mere, near Ellesmere; White Mere; Newton Mere; and from Marrington (1922 *RBF*). Not seen in the region for many years, and probably a victim of eutrophication.

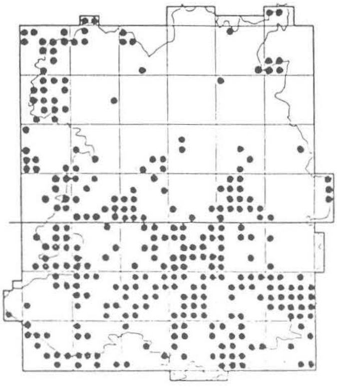
BEDSTRAW FAMILY
RUBIACEAE

Field madder
Sherardia arvensis L.



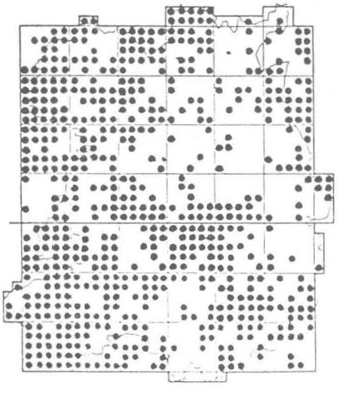
Arable fields and other cultivated or disturbed ground, particularly on limestone, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm, open, common field weed on dry usu calc soils. Ass: *Anaga arv, Capse bur, Veron per, Viola arv.*
Locally frequent in Oswestry upland and on Wenlock Edge: local elsewhere and absent from extreme SW and much of NE plain.

Woodruff
'Kiss-me-quick'
Galium odoratum (L.) Scop.
(*Asperula odorata* L.)



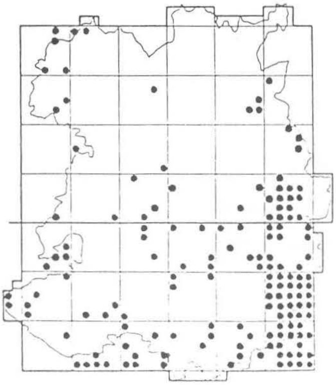
Woodland edges and clearings, open scrub and hedgebanks esp on limestone, on damp to dry soils, PN med, base rich, mod acid to calc, ½ shade to shade, cool, sheltered, intolerant of grazing, often forming extensive patches, apparently a good indicator species for old woodland on base rich soils. Ass: *Melic uni, Orchi mas, Lamia gal, Sanic eur.*
Frequent throughout hill country on limestone and other basic rocks: local to rare in lowland.

Crosswort
Galium cruciata (L.) Scop.
(*Cruciata laevipes* Opiz; *C. chersonensis* auct.)



Hedgebanks, grassy verges, edges of scrub and tall grassland, on damp to dry soils, PN med, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered, intolerant of heavy grazing or mowing. A typical member of the transitional community between grassland and scrub. Ass: *Malva mos, Hyper per, Linar vul, Arrhe ela, Anthr syl.*
Frequent to locally abundant throughout region except arable NE.

Hedge-bedstraw
Galium mollugo L.

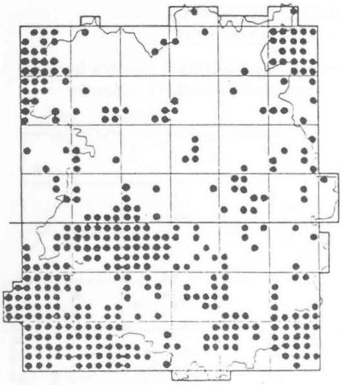


Hedgebanks, verges and tall grassy places in scrub, on dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered and v. warm. Ass: *Tamus com, Trifo med, Arrhe ela, Centa nig, Hyper per, Hyper hir, Lathy pra, Convo arv, Clino vul.*
A markedly thermophilous species, frequent in Lower Severn Valley: sparse or rare further N and W in both uplands and lowlands.

Upright hedge-bedstraw
Galium album Miller
(*G. erectum* Hudson)
Dorrington sandpit (1963 Hilda Murrell & EMR). In the newer part of Morton Churchyard (1980 EDP); may have been overlooked or not distinguished from *G. mollugo* elsewhere.

Lady's bedstraw
Galium verum L.
Old species-rich pastures, grassy banks and verges, rocky hillsides and open scrub, on dry often shallow or disturbed soils, sometimes associated with ant-hills, PN poor, base poor to rich, acid to calc, sunny, warm, tolerant of grazing and trampling but not of compet with vigorous grasses. Ass: *Camp rot, Hiera pil, Rumex alla, Veron off, Hyper pul, Festu ovi, Agros cap, Thymu pra.*
Frequent throughout region in suitable habitats.

Heath bedstraw
Galium saxatile L.
(*G. harcynicum* Weigel)
Moorland, heath, poor hill grassland and open acid woods, on damp to dry soils, PN poor, base poor, acid, sun to ½ shade, exposed, v. tolerant of grazing and of seasonal shade, persisting under bracken and around gorse bushes. A useful indicator of unimproved hill grassland. Ass: *Festu ovi, Agros cap, Danth dec, Nardu str,*



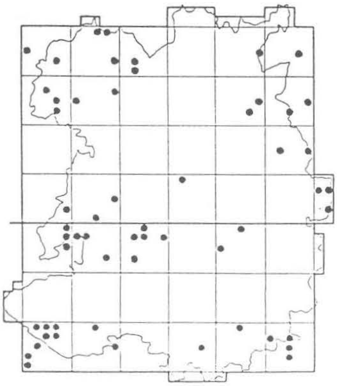
Carex pil, Poten ere, Veron off, Polyg ser, Desch fle.
Frequent to abundant in Oswestry uplands; W Central hills; Clun Forest; Clee hills; and Wyre Forest: locally frequent to sparse elsewhere.

Limestone bedstraw
†Galium sterneri Ehrend.
Extinct?
Recorded in the past (as *G. pumilum*), from Titterstone Clee, but identification doubtful: K M Goodway did not accept this record for either *G. sterneri* or *G. pumilum* Murray s.s.

Great marsh-bedstraw
Galium elongatum C. Presl
Reedswamp, tall sedge fen, pond margins, ditches, stream sides, disused canals, usu in shallow standing water, PN med to rich, base med to rich, mod acid to alk, sun to ½ shade, sheltered. Ass: *Sparg ere, Alism pla, Glyce max, Carex amis, Myoso sco.*
Recorded in some areas and probably quite frequent in most parts of region but not consistently mapped.

Common marsh-bedstraw
Galium palustre L.
(incl. *G. witheringii* Sm.)
Fens, marshy hollows in fields, pond sides, ditches, banks of rivers and canals, on wet mud or in damp intermittently flooded soils, PN med to rich, base poor to rich, acid to calc, sun to ½ shade. A typical member of the tall-herb community at the edge of waterbodies subject to winter flooding. Ass: *Juncu eff, Juncu acu, Lychn flo, Berul ere, Myoso lax, Ranun fla.*
Widespread throughout region.

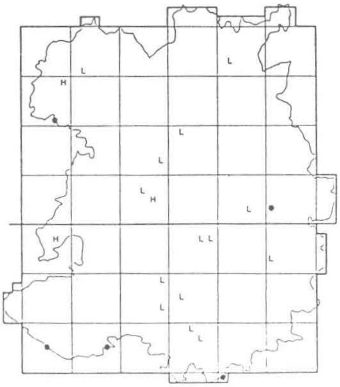
Fen bedstraw
Galium uliginosum L.
Fen meadows and base-rich flushes with trickling water, on wet to moist soils, PN poor, base rich, neut to calc, sunny, sheltered, grazed or ungrazed. A typical member of the short rich fen community. Ass: *Briza med, Juncu sub, Carex pcea, Valer dio, Sagin nod, Pingu vul, Parna pal.*
V. locally frequent in Oswestry uplands; N Shropshire meres; W Central hills; and Clun Forest: sparse elsewhere and absent from much of arable plain.



Cleavers, Goosegrass
'Sweetheart'
Galium aparine L.
Hedgebanks, edges of fields, scrub, woodland, plantations, gardens, rubbish tips, waste ground, on dry to damp soils, PN rich, base med to rich, mod acid to calc, sun to shade. One of the most vigorous annual scramblers, seeding itself in profusion on bare patches or disturbed ground where the soil is really fertile, and persisting for a time in closed vegetation.
Difficult to clear when brushing hedges. Ass: *Urtic dio, Anthr syl, Elymu rep, Allia pet, Chaer tem, Poa tri.*
Widespread throughout region esp in well farmed areas.

HONEYSUCKLE FAMILY
CAPRIFOLIACEAE

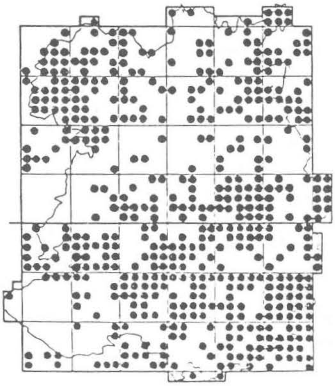
Dwarf elder, Danewort
'Wallwort'
***Sambucus ebulus** L.



Roadside verges, hedgebanks and stream banks, generally on base-rich soils. Rare, only one site well inside v c 40 by R Severn by the 'Woodbridge' S of Coalport (1979 O Hunter); Hammer Mill Hill, Tenbury, just in Shropshire. Adley Moor near Bedstone, also just in v c 40; roadside S of Llanymynech in v c 47; Knucklas v c 43. Formerly widespread in the region.

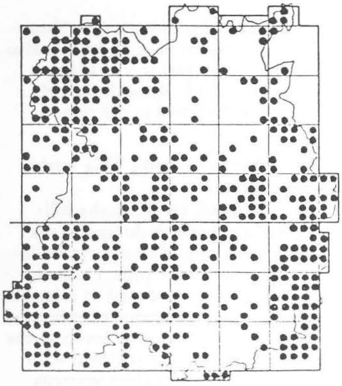
Elder
'Ellern', 'Skewer wood', 'Dog bush'
Sambucus nigra L.
Open woodland, scrub, bushy hillsides, hedges, rubbish dumps, waste ground, gardens and near farm buildings, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sun to shade, a clear indicator of enhanced phosphate and usu nitrate levels in the soil and thus closely associated with badger setts, former rabbit warrens and places where manure or compost have been dumped in the past. Occasionally forming large pure stands; there is a remarkable area of nearly 2 acres dominated by elder on the river bank at Preston Montford. Ass: *Crata mon, Fraxi exc, Ulmus gla, Acer pse, Salix cap, Rubus fru, Urtic dio.*
Frequent to abundant throughout region and probably increasing.

Guelder-rose
Viburnum opulus L.



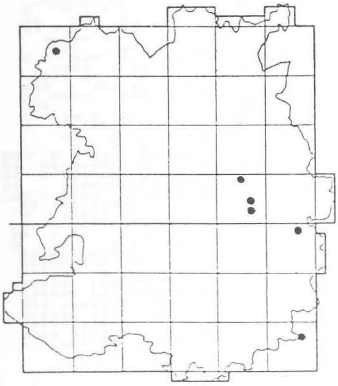
Old broad-leaved woods, carr and swamp, scrub and hedgerows, on moist to damp, often winter-wet clay, silt or peat, PN med, base med to rich, neut to calc, ½ shade to shade, a characteristic shrub of ancient deciduous woodland in the lowlands. Ass: *Cornu san, Coryl ave, Prunu pad, Alnus glu, Fraxi exc, Ribes nig, Salix cin.*
Frequent throughout region except at highest altitudes.

Snowberry
***Symphoricarpos rivularis** Suksdorf
A naturalised and well established introduction in game coverts, ornamental woods, hedges and wild gardens, on moist to damp, often winter-wet, loamy, clay or peaty soil,



PN med to rich, base med to rich, mod acid to calc, ½ shade to shade, sheltered, sometimes forming dense thickets. Ass: *Ulmus pro, Fraxi exc, Salix fra, Salix cin, Sambu nig, Solan dul.* First record probably 1916 near Shrewsbury. Frequent in NW; SW; Telford area; Lower Severn Valley: locally frequent to sparse elsewhere.

Fly honeysuckle
***Lonicera xylosteum** L.



Naturalised rather than native in this region in open ornamental woodland, scrub, hedgerows, old railway tracks and abandoned gardens, at Selattyn; Paradise and Dale Coppice, Coalbrookdale; Badger Dingle; Bewdley; Limekiln Wood.

Honeysuckle
'Woodwind'
Lonicera periclymenum L.

Hedges and scrub, scrambling over bushes or trees, also as a ground creeper in woodland, on damp to dry soils, PN poor to med, base poor to rich, acid to neut, sun to shade. The wide ecological range of this plant from hedges by fertile lowland fields to shady acid oak woods suggests some genetical diversity, but this has not been studied. Honeysuckle can be more dangerous to trees in woods than ivy, because of its habit of twining and strangling as the tree grows.
Ass: hedgerows – *Rosa can, Tamus com, Bryon dio, Crata mon, Coryl ave, Sambu nig;* woodland – *Heder hel, Vacci myr, Holcu mol, Hyaci non, Dryop dil.*
Widespread throughout region. Shropshire is notable for the abundance of flowering honeysuckle in midsummer.

Perfoliate honeysuckle
$ *Lonicera caprifolium L.

Not in v c 40.
Recorded among scrub on the Welsh part of Llanymynech Rock Nature Reserve (1977 EDP). No doubt a garden escape spread by birds.

***Lonicera nitida** Wils.

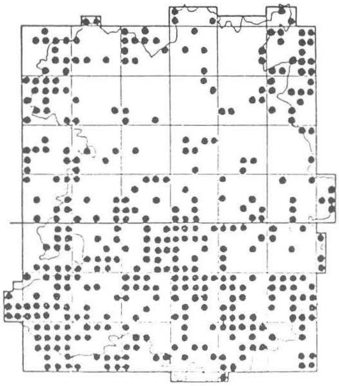
This ugly plant is well established as game cover in 19th century plantations and is occasionally naturalised in hedges. It was severely affected by the hard winter of 1981–82.

***Lonicera involucrata** Banks

Established for a length of c40 m beside unsurfaced lane running N from Cockshutt Lane N of Broseley, growing under scrub on a steep bank (1982 WAT).

MOSCHATEL FAMILY
ADOXACEAE

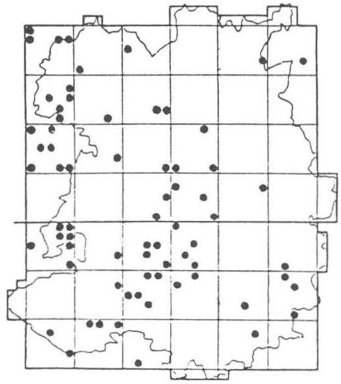
Moschatel, Townhall-clock
Adoxa moschatellina L.



Open places in old woodlands and scrub, shady hedgebanks, on damp to dry loam or clay soils, PN med, base med to rich, mod acid to neut, ½ shade, sheltered, ungrazed, often forming pure stands but a poor competitor with taller plants. One of the group of woodland species flowering in the spring before the woodland canopy is fully developed. Ass: *Primu vul, Silen dio, Anemo nem, Ranun fic, Viola odo, Brach syl, Mercu per, Hyaci non.*
Frequent in wooded parts of the upland except on v. acid soils; locally frequent to sparse in the N plain.

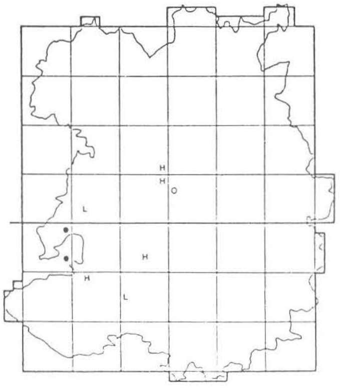
VALERIAN FAMILY
VALERIANACEAE

Common cornsalad, Lamb's-lettuce
Valerianella locusta (L.) Betcke



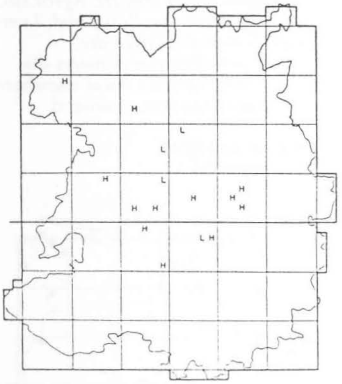
Rock outcrops, stony places and open patches in grassland, quarries, stone tips and railway ballast, on dry sandy or stony soil, PN poor to med, base med to rich, neut to calc, sunny, warm, exposed, intolerant of compet with taller plants and favoured by occasional disturbance of the soil. Ass: *Acino arv, Ceras glo, Ceras sem, Eroph ver, Myoso ram, Aira pra, Arena ser, Festu rub.*
Locally frequent in both upland and lowland in W half of region: rare in E.

Keeled-fruited cornsalad
Valerianella carinata Loisel.



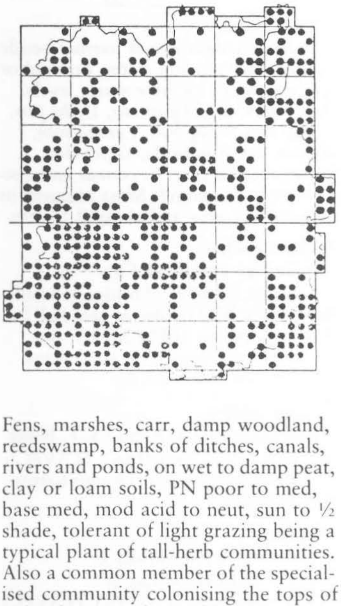
Rocky or grassy banks, lane-sides and quarries, on dry, shallow, well-drained stony or sandy soils, PN poor, base med to poor, acid to neut, sunny, warm, sheltered, tolerant of grazing and trampling but not of compet, favoured by disturbance. Ass: *Aira pra, Festu ovi, Geran mol, Teesd nud, Hiera pil, Rumex alla.*
Priestweston (1981 MW); in v c 47 at Plas y du near Church Stoke (1981 JMR); SE-facing roadside hedgebank on Abbots Castle Hill near Claverley, within v c 40 but just outside region (1977 BRF).
Formerly recorded from Boreton Bank and several localities in SW quarter.

Narow-fruited cornsalad
†Valerianella dentata (L.) Pollich



Extinct?
Formerly recorded from many localities in Shrewsbury district, and shown in *ABF* for SJ 20 and 22.

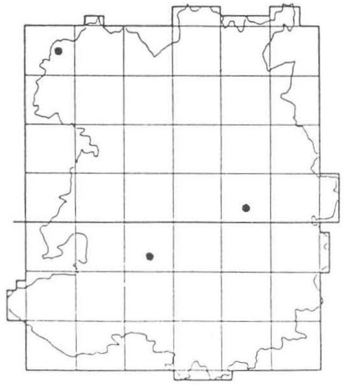
Common valerian
Valeriana officinalis L.



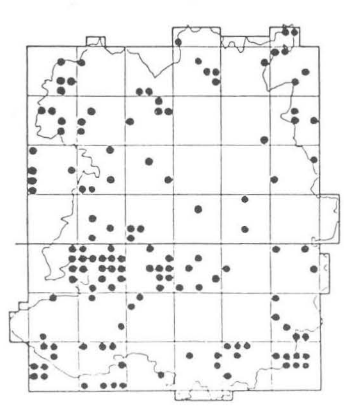
Fens, marshes, carr, damp woodland, reedswamp, banks of ditches, canals, rivers and ponds, on wet to damp peat, clay or loam soils, PN poor to med, base med, mod acid to neut, sun to ½ shade, tolerant of light grazing being a typical plant of tall-herb communities. Also a common member of the specialised community colonising the tops of old sedge tussocks in alder carr. Ass: *Filip ulm, Angel syl, Lychn flo, Lysim vul, Lythr sal, Phala aru, Vicia cra.*
A genetically diverse species, but no attempt has been made to distinguish segregates in the present study.
Frequent to locally frequent in suitable habitats throughout region.

Pyrenean valerian
*Valeriana pyrenaica L.

Naturalised and well established in old ornamental woods, wild gardens and grassy banks. Near Selattyn; in Rectory Wood; and at Benthall Hall.



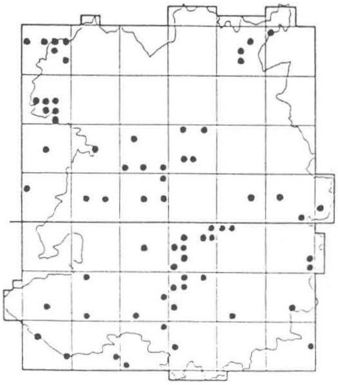
Marsh valerian
Valeriana dioica L.



Fens, marshes and flushes, on peat, clay or loamy soils with seeping water and high water-table, moist to damp, PN poor, base med to rich, mod acid to calc, sun to ½ shade, tolerant of mod grazing and trampling. One of the commonest members of the distinctive short fen community. Ass: *Lychn flo, Calth pal, Juncu art, Trigl pal, Hydro vul, Carex dem, Menth aqu, Carex pul.*
Locally frequent in W Central hills and NW uplands: local elsewhere and almost absent from arable NE.

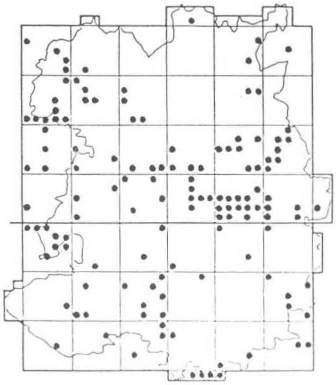
Red valerian
***Centranthus ruber** (L.) DC.
(*Kentranthus ruber*)

Ledges and crevices of limestone rock outcrops, rocky banks, quarries and old mortared walls, on dry stony soils, but often rooted into damp crevices, PN poor to med, base rich, calc, sunny, warm, exposed. Extensively naturalised and long established not only near habitations. Three more or less equally common colour forms are found: red, pink and white. Ass: *Leuca vul, Scabi col, Buddl dav, Parie jud.*
Frequent in Oswestry uplands and Wenlock Edge area: local to sparse elsewhere.



TEASEL FAMILY
DIPSACACEAE

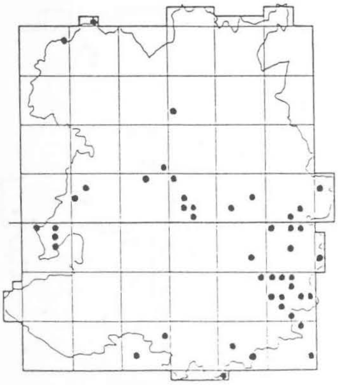
Teasel
Dipsacus fullonum L.



Disturbed ground, rubbish tips, wasteland, trampled riverbanks, muddy shingle, over-grazed horse paddocks and neglected gardens and allotments, on moist to dry soils, PN med to rich, base rich, mod acid to calc, sunny, warm, sheltered. A member of the tall-weed community on open disturbed soils but a poor competitor not persisting long in closed vegetation. Ass: *Artem vul, Tanac vul, Brass nig, Coniu mac, Cirsi arv, Epilo hir, Phala aru, Myoso sco, Solan dul, Rumex obt.*
Locally frequent throughout region except Clun Forest; Clee hills; and NE lowlands.

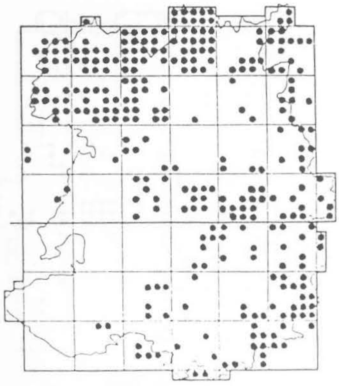
Small teasel
Dipsacus pilosus L.

Open edges of woodland, often at foot of steep valley sides, on damp or dry but winter-wet clay or loamy soil, PN med to rich, base med, mod acid, sun to ½ shade, warm, sheltered, ungrazed. Solitary or in small pure stands.
This thermophilous species is markedly



restricted to the Bridgnorth and Lower Severn Valley area in the SE; to the Shrewsbury to Cressage area; and to Marrington Dingle: only rare records elsewhere.

Field scabious
Knautia arvensis (L.) Coulter

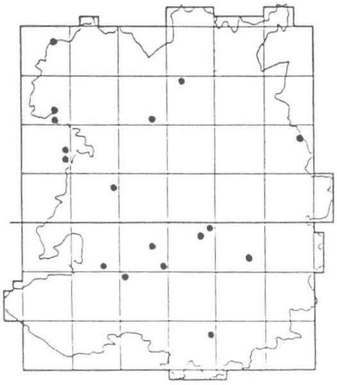


Roadside verges, edges of fields and disturbed ground, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Intolerant of grazing but withstands occasional mowing, not v. persistent. Ass: *Echiu vul, Cardu nut, Cardu aca, Coniu mac, Trago pra, Arrhe ela.* Frequent in NW and SE of region: locally frequent elsewhere in lowlands but more or less absent from higher hill country.

Small scabious
Scabiosa columbaria L.

Old pastures, open scrub, ledges and crevices of cliffs and quarries, on limestone or basic igneous rock, on dry shallow stony soil, PN poor, base rich, neut to calc, sunny, exposed, tolerant of grazing. Ass: *Pimpi sax, Helia num, Sangu min, Origa vul, Thymu pra, Carex car, Inula con.* Sparse in hill country from Oswestry and Breidden to Clee Hill. Surprisingly uncommon on both the main limestone outcrops.

(Map: next column)



Devil's-bit scabious
'Blueheads', Gentlemans Buttons'
Succisa pratensis Moench

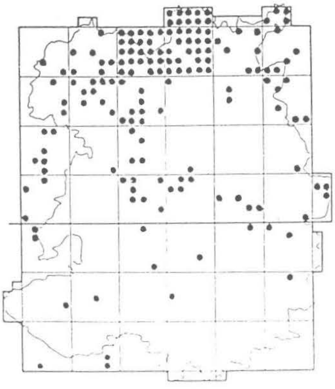
Damp pastures, meadows, marshy hollows in fields, flushes, valley mires and grassy moorland, on moist to damp peaty or clay soils with impeded drainage and high water-table, PN poor, base poor to med, acid to mod acid, sun to ½ shade, tolerant of grazing. A strong competitor in herb-rich grassland communities. Ass: *Poten ere, Pedic syl, Lychn flo, Galiu sax, Stach off, Molin cae, Carex pcea, Carex ova.* Locally frequent esp in uplands: rare in arable NE.

DAISY FAMILY
COMPOSITAE

Sunflower
***Helianthus annuus** L.

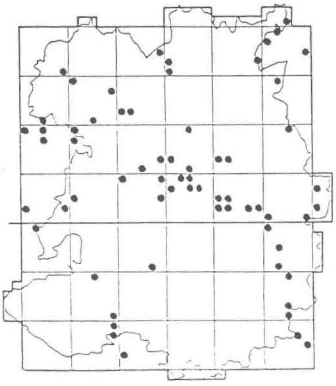
A single plant recorded on a roadside verge between Yockleton and Westbury far from any houses (1982 CAS): scarcely naturalised.

Nodding bur-marigold
Bidens cernua L.



Edges of ponds and slow moving streams, sometimes among reedbeds, rooted in mud or silt by water with a variable water level, often winter-flooded, PN rich, base med to rich, mod acid to alk, sunny, sheltered. Often forming extensive pure stands or mixed with *B. tripartita.* An impersistent pioneer. Ass: *Biden tri, Agros sto, Lythr por, Polyg per, Polyg hyd, Lemna min, Ranun fla, Glyce dec.* Frequent in N Shropshire meres district and NW lowland: local elsewhere and absent from most of upland.

Trifid bur-marigold
Bidens tripartita L.



In similar habitats to *B. cernua* beside still or slow moving water, on mud or silt, subject to variable water levels. Ass: *Biden cer, Agros sto, Lythr por, Polyg per, Polyg hyd, Lemna min, Ranun sce, Ranun fla, Glyce dec.* Less common than *B. cernua* and also confined to lowland. Most frequent in Shrewsbury area and along R Severn.

Gallant soldier
***Galinsoga parviflora** Cav.

Casual: in field SW of bridge at Stableford (1978 WEH); also at Lem Hill (v c 37), outside inn (1974 MCC); one plant in soil dumped on road verge near Bewdley (1976 LJ).

Shaggy soldier
***Galinsoga ciliata** (Rafin.) S. F. Blake

Recorded from Pant (1967 *TCSVFC);* and from sandpit near Hungryhatton (1979 WVP).

Ragweed
***Ambrosia artemisiifolia** L.

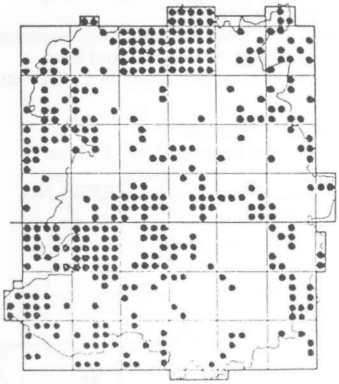
Casual; railway sidings at Llanymynech station (1963 *TCSVFC*).

Common ragwort
'Cowfoot'
Senecio jacobaea L.

Pastures and meadows, verges and hedgebanks, paddocks, waste ground, quarries, open scrub, on dry to damp but well drained soils, PN med, base med to rich, mod acid to calc, sunny, exposed. A persistent and troublesome grassland weed, encouraged by overgrazing (particularly by sheep or horses) and not easily got rid of except by hand-pulling, chemical treatment or

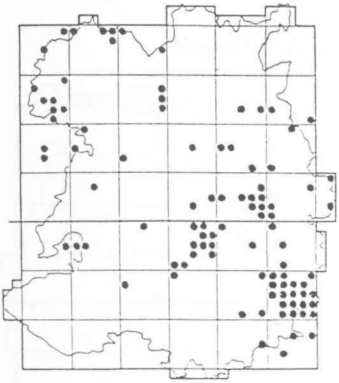
changes in grazing regime. The ragwort population is sometimes markedly affected by attack from the caterpillars of the Cinnabar Moth. Ass: *Cynos cri, Arrhe ela, Alope pra, Cirsi arv, Cirsi vul, Rumex obt, Digit pur, Verba tha.*
Abundant to frequent throughout region.

Marsh ragwort
Senecio aquaticus Hill



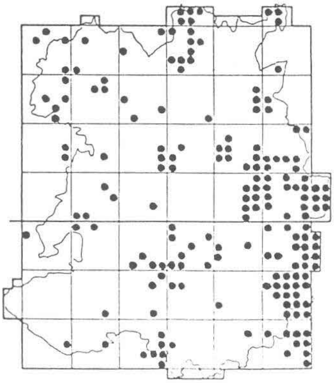
Wet grassland, open scrub, edges of woodlands, fens, marshy hollows, on wet to damp usu clay soils, PN med, base poor to med, mod acid to neut, sun to ½ shade, usu avoided by grazing animals and therefore thrives in undergrazed damp pastures. Ass: *Achil pta, Calth pal, Lychn flo, Galiu pal, Pulic dys, Scrop aur.*
Frequent but unevenly recorded. Throughout region except at highest altitudes.
The hybrid *S. aquaticus* × *jacobea* is not uncommon where the parents are adjacent.

Hoary ragwort
Senecio erucifolius L.



Open grassy places and waste ground, on clay or calcareous soils, often disturbed, damp to dry but sometimes winter-wet, PN poor to med, base med to rich, mod acid to calc, sunny. A strong persistent competitor in tall-herb communities, seldom grazed. Ass: *Cardu cri, Lathy pra, Daucu car, Resed lola, Trise fla.*
Locally frequent in Wenlock Edge area; Lower Severn Valley; and Oswestry upland: sparse elsewhere.

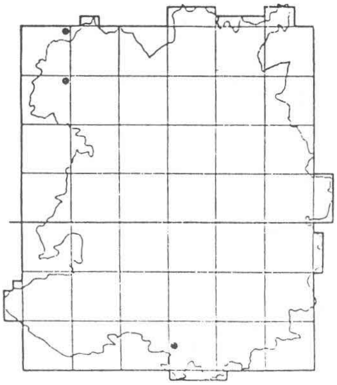
Oxford ragwort
***Senecio squalidus** L.



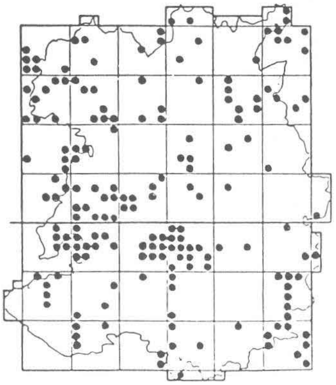
A v. well established adventive on disturbed stony ground mainly on railway ballast and quarry spoil but also on mortared walls and screes, on dry stony soils, PN poor to med, base med to rich, mod acid to calc, sunny, exposed. A pioneer species not persisting in closed vegetation. Ass: *Epilo cil, Chame ang, Resed lola, Linar rep, Matri mat, Arabi tha.*
Frequent to abundant in E and SE: locally frequent elsewhere esp in lowland.
First recorded in *RBF* for 1916 where Mr G Potts writes "Some 7 or 8 years ago, perhaps even more, I found *S. squalidus* growing abundantly on railway banks, about half a mile the Broseley side of Linley Station. It was where some ballast had been tipped to strengthen or increase the embankment on the riverside."
But *LRH* says "First recorded in the county near Knighton (Div. 6), 1906, by W. B. Allen."

Welsh ragwort
Senecio cambrensis Rosser

Disturbed ground on roadsides and waste land on dry soils, PN rich, base rich, neut to calc, sunny, warm, ungrazed. A vigorous pioneer of open fertile habitats. Ass: *Allia pet, Plant maj, Polyg avi, Poa ann, Senec jac, Senec vul, Sonch ole.*
Welsh ragwort, which originated as a polyploid hybrid first seen in Flintshire in the 1940s, has recently spread into our region near Chirk (1982 PMB), and has also been recorded at Oswestry and Ludlow (1972 DHK). One of the two "nationally rare species" for v c 40, but probably increasing fast.



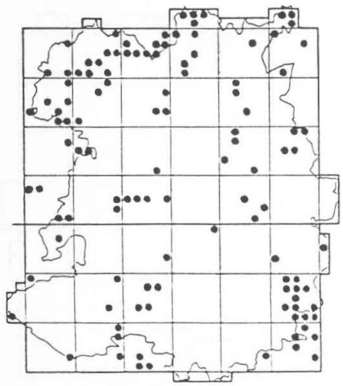
Heath groundsel
Senecio sylvaticus L.



Open patches on grassy or heathy slopes, in woodland clearings, or roadside banks, on shallow sandy or stony soil, PN poor, base poor, acid, sun to ½ shade, a poor competitor but a frequent pioneer of recently burnt or disturbed ground. Ass: *Rumex alla, Agros cap, Digit pur, Aira pra, Festu ovi, Galiu sax, Hyper hum.*
Locally frequent in Oswestry uplands; W Central hills; and parts of lowland: avoiding limestone and intensive arable areas.

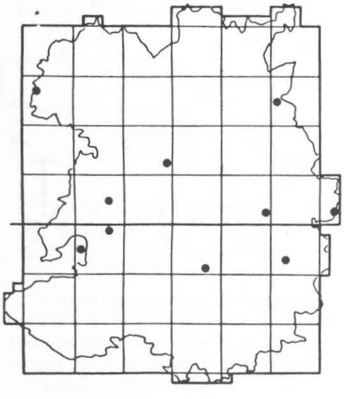
Sticky groundsel
Senecio viscosus L.

Railway ballast and other limestone rubble, on dry stony soils, PN rich, base rich, neut to calc, sunny, exposed. A pioneer species but a poor competitor. Probably more nutrient-demanding than *S. squalidus*. Ass: *Daucu car, Arabi tha, Arena lep, Ceras glo, Chaen min, Resed ltea, Vulpi myu.*
Locally frequent on old railway lines in NW and SE of region: sparse elsewhere and mainly confined lowlands.



Groundsel
Senecio vulgaris L.

Cultivated fields, gateways, verges, farmyards, waste ground, rubbish tips, gardens, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny. One of the commonest and most ubiquitous annual weeds of fertile ground, but not a strong competitor nor difficult to eradicate. Ass: *Stell med, Poa ann, Lamiu pur, Polyg per, Matri mat, Plant maj.*
Abundant throughout region.



Var. **hibernicus** Syme (var. **radiatus** auct.) is locally frequent throughout region.

(Map above)

***Senecio doria** L. ssp. **doria**

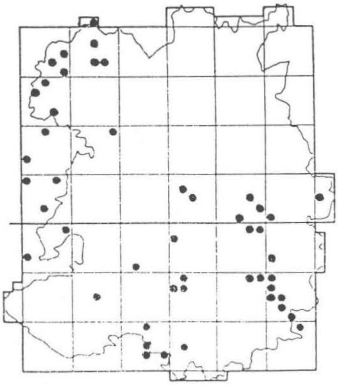
A clump of this species is well established on the side of a damp hollow at the E end of Merrington Green (1982 CAS).

Broad-leaved ragwort
†***Senecio fluviatilis** Wallr.

Extinct.
An account of the discovery of "Saracen's Consound" near Chirbury by Bowles and Coote in 1632 is given in Chapter 2. It has since been reported once in Shropshire from Hints near Coreley (*LFS*), but there are no recent records.

Ligularia tangutica (Maxim.) Bergmans
(*Senecio tanguticus* Maxim.)
Established on rubbish tips in part of old quarry near Craig Llwyn (1975 EDP).

Leopard's-bane
***Doronicum pardalianches** L.

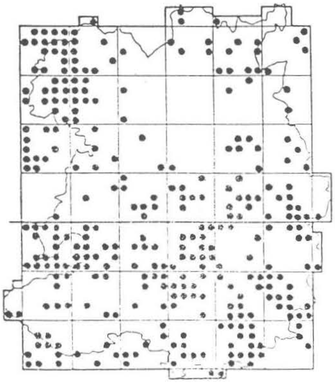


Naturalised and well established on damp shady roadside verges and stream and riverbanks in the SE of region: locally frequent in NW.

Colt's-foot
Tussilago farfara L.

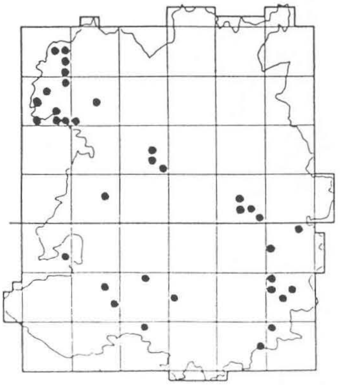
Bare patches and disturbed ground on riverbanks, railway cuttings, edges of fields, hedgebanks, rubbish tips, wasteland, canal banks, on heavy poorly drained soils with high winter water table, usu clay or silt but sometimes stony, PN poor, to med, base rich, mod acid to calc, sun to half shade, sheltered. A perennial, spreading by stolons to form extensive pure patches. Ass: *Chame ang, Equis arv, Dacty glo, Salix cap.*
Widespread and locally frequent esp in boulder clay areas: less common in the hills.

Butterbur
Petasites hybridus (L.) P. Gaertner, B. Meyer & Scherb.



Disturbed ground, unstable riverbanks, canal banks, shingle spits, steep roadside verges, quarry floors, sometimes stony but usu clay or silt soils, with little humus, wet to damp, often flooded or with standing water in winter, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Forming extensive pure patches but intolerant of compet, a plant of wetter habitats than colt's-foot. Ass: *Symph × upl, Phala aru, Rumex obt, Aegop pod.*
Frequent throughout region except parts of arable N.
The rare 'female' plants were recorded in *LFS* from Wellington and near Oswestry; more recently in v c 50 near Chirk.

Winter heliotrope
***Petasites fragrans** (Vill.) C. Presl

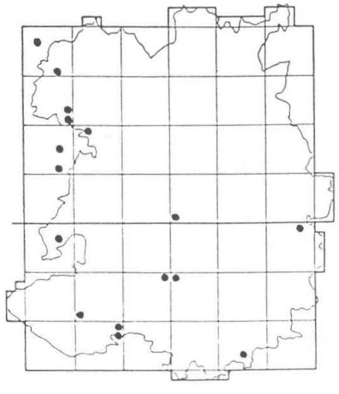


Naturalised and well established as a garden weed and on damp roadside verges and hedgebanks and field corners.
Scattered from Oswestry area to Lower Severn Valley but not recorded from higher hill country or NE lowlands.

Pot marigold
***Calendula officinalis** L.

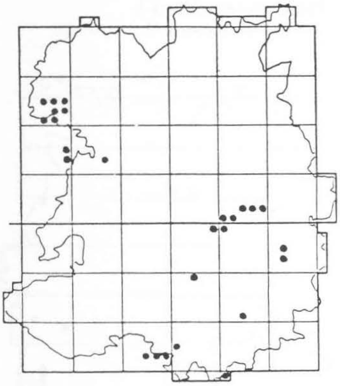
Casual: Dorrington tip, Woore (1977 BRF).

Elecampane
***Inula helenium** L.



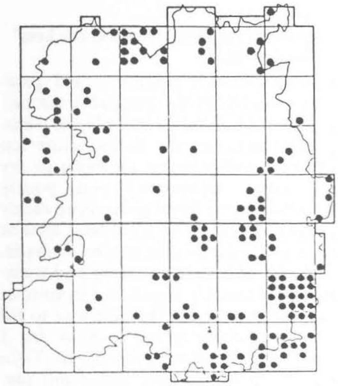
Naturalised and long established in old cottage gardens and on verges and hedgebanks, in old pastures and edges of open woods, generally on damp fertile soils.
Rather sparse and mainly confined to valleys in upland areas of W and S.

Ploughman's-spikenard
Inula conyza DC.



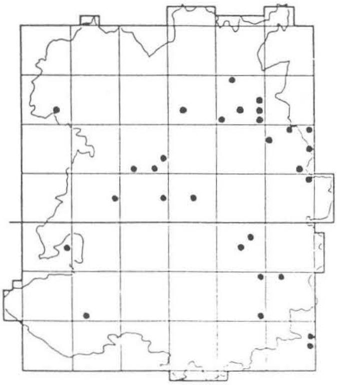
Open scrub and grassy banks, old pastures, rock ledges and limestone quarries, on shallow, dry, well drained stony soils, PN poor, base rich, mod acid to calc, sunny, warm, exposed, tolerant of light grazing and occasional mowing being typical of the transitional community between grassland and scrub. Found on basic igneous rocks as well as limestone. Ass: *Helia num, Scabi col, Pimpi sax, Origa vul, Rosa pim.*
Very locally frequent in Oswestry uplands and Much Wenlock area with scattered records from Breidden; Cardeston; Wenlock Edge; Bridgnorth; Farlow; and Ludlow area.

Common fleabane
Pulicaria dysenterica (L.) Bernh.



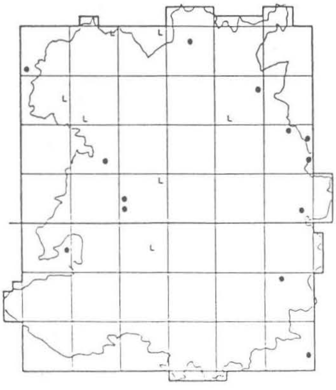
Damp hollows in grassland, open tall-herb communities, ditch banks, on moist to damp winter-wet, ursu clay soils, PN poor to med, base med to rich, mod acid to neut, sunny, sheltered. Tolerates some grazing but not extensive trampling, persists well in ungrazed herbaceous vegetation. Ass: *Filip ulm, Agros sto, Holcu lan, Carex hir, Vicia cra, Lathy pra.*
Frequent in Ellesmere area and Lower Severn Valley: locally frequent to sparse elsewhere and almost absent from higher hills and arable NE.

Common cudweed
Filago vulgaris Lam.
(*F. germanica* L., non Hudson)



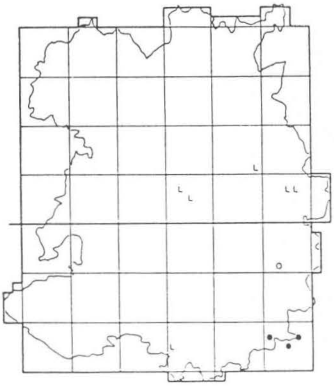
Rough grassy banks, disturbed heaths, tracksides and waste ground on shallow, dry, sandy or stony soils, PN poor to med, base poor to med, acid to mod acid, sunny, warm. A pioneer of open vegetation on poor dry sites. Ass: *Aira pra, Agros cap, Arrhe ela, Crepi cap, Digit pur, Trifo str, Callu vul, Galiu sax, Polyg ser.*
V. locally frequent in NE lowlands (former heathland): sparse elsewhere on plain and in SE: rare in W and absent from most of uplands, though found on quarry spoil on Titterstone Clee Hill.

Small cudweed
Filago minima (Sm.) Pers.
(*Logfia minima* (L.) Dumort.)



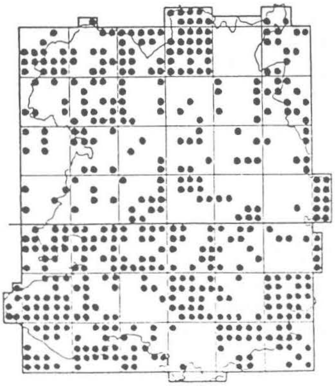
Bare patches and rock outcrops, dry stony hillsides and heathland, on dry sandy or shallow stony soils, PN poor, base poor to med, acid to mod acid, sunny, warm. A characteristic member of the winter annual community on non-calcareous soils and occasionally a pioneer weed on disturbed heathland. Tolerant of rabbit grazing. Ass: *Ornit per, Moenc ere, Rumex alla, Eroph ver, Jasio mon, Aphan mic, Aira pra, Myoso dis.*
Rare: scattered records from W and E edges of region. Formerly more frequent, but probably overlooked.

Heath cudweed
Gnaphalium sylvaticum L.
(*Omalotheca sylvatica* (L.) Schultz Bip. & F. W. Schultz)



Edges of rides in open oak forest, on dry, stony, acid soils.
Rare: Wyre Forest, 2 sites just inside v c 40, 1 outside. Formerly recorded from several localities in E Central part of region and near Ludlow.

Marsh cudweed
Gnaphalium uliginosum L.
(*Filaginella uliginosa* (L.) Opiz)

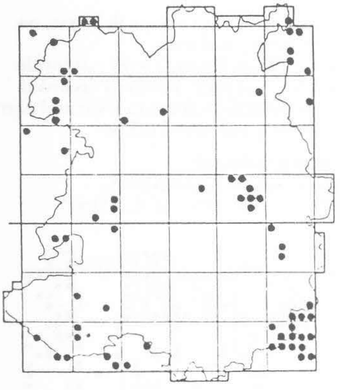


Shallow puddles and bare patches of mud in tracks and field gateways, on

wet to moist, winter-flooded clay, loam or peaty soils, PN med, base med, acid to mod acid, sunny, sheltered. Intolerant of compet but withstanding some grazing and favoured by trampling or other disturbance of the ground. A typical pioneer species particularly in upland fields. Favoured by impeded drainage and flourishes in wet years. Ass: *Juncu buf, Matri mat, Juncu bul, Plant maj, Poa ann.*
Frequent throughout region in suitable habitats.

Mountain everlasting
$Antennaria dioica (L.) Gaertner
Extinct in v c 40.
Rough hill grassland, on dry, well-drained loamy soils over limestone, PN poor, base med to rich, mod acid to calc, sunny, exposed, cool. Tolerant of heavy grazing but a poor competitor with taller grasses. Ass: *Festu ovi, Agros cap, Thymu pra, Campa rot, Hiera pil.*
A single patch of this species has long been known on the brackeny slope above the cave called The Ogof on the Golf course on Llanymynech Hill. Formerly also known at the S end of Llynclys Common near Jacob's Ladder in Shropshire. This inconspicuous species of montane grasslands may have been overlooked elsewhere in W hills.

Goldenrod
'Aaron's Rod'
Solidago virgaurea L.

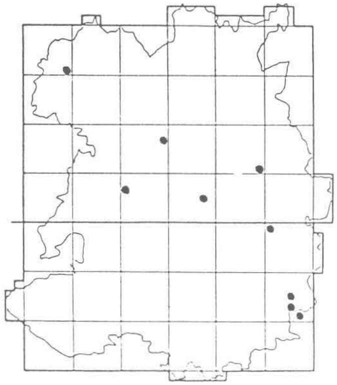


Old species-rich woodlands, grassy banks, outcrops often of basic igneous rocks or limestone, on damp to dry shallow stony soils, PN poor, base med to rich, acid to calc, ½ shade or shade, sheltered. Intolerant of grazing and a poor competitor with tall grasses. Ass: *Lathy mon, Luzul pil, Polyp int, Mycel mur, Fraga ves, Origa vul.*
Frequent in extreme SE (Wyre Forest); Telford; locally frequent in hill country in W of region: rare in lowlands.

Canadian goldenrod
***Solidago canadensis** L.
A small patch of this common garden species of goldenrod is established by the road from Ketley to Lawley Bank (1982 WAT); also on bank above R Severn near Bewdley (1979 L J); and on railway sidings SE of Shrewsbury Station (1983 CAS).

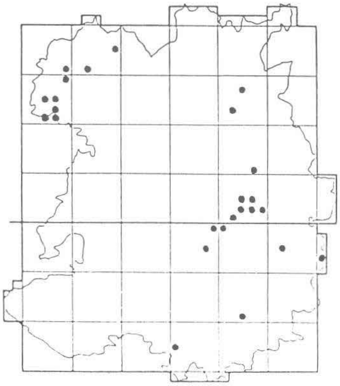
***Solidago gigantea** Aiton
ssp. **serotina** (O. Kuntze) McNeill
A large dense colony monopolising an area of c50sq m on waste ground between Ketley and New Hadley (1982 WAT).

Michaelmas-daisy
***Aster novi-belgii** L.



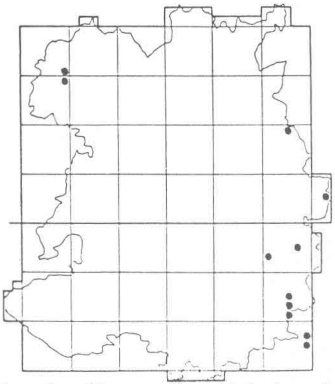
Naturalised and well established on colliery spoil, river and stream banks, old railway lines, on disturbed ground and usu on stony, well-drained soils. Locally frequent in Lower Severn Valley: scattered records elsewhere from Telford to Oswestry.

Blue fleabane
Erigeron acer L.



Bare patches in species-rich grassland and floors of disused limestone quarries, on dry sometimes winter-wet shallow stony soils, PN poor, base med to rich, calc, sunny, warm, tolerant of trampling but not of heavy grazing nor of compet with taller plants. Ass: *Sangu min, Linum cat, Inula con, Black per, Leont his, Briza med, Genti ama.*
Locally frequent in Oswestry uplands and Much Wenlock area: sparse elsewhere in NW, NE and SE of region.

Canadian fleabane
***Erigeron canadensis** L.
(*Conyza canadensis* (L.) Cronq.)

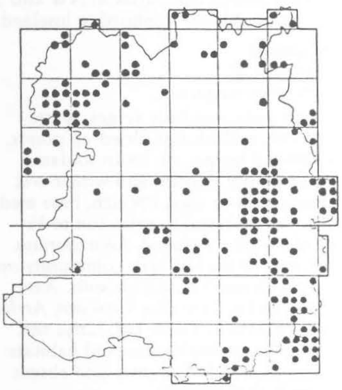


Introduced but a well established weed of disturbed ground on railway banks and roadside verges, sidings and station yards, cracks in pavement and in sandpits, on dry stony or sandy soils. Local and mainly confined to extreme E of region with outlying records from Oswestry. First record Shrewsbury rly sidings (1959 D E Allen *Proc BSBI* 1962). (See p. 27.)

Mexican fleabane
***Erigeron mucronatus** DC.
(*E. karvinskianus* DC.)
Copiously established on the paved terrace and associated walls and steps of the SE frontage of Dudmaston Hall (1982 WAT); and on the natural rock-face at Powis Castle (v c 47).

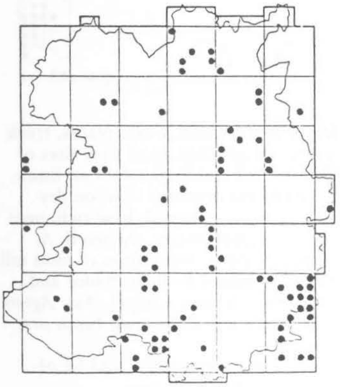
Daisy
'Bachelor's buttons', 'Hen and chickens'
Bellis perennis L.
Old species-rich pastures, field gateways, stream banks (probably the original wild habitat of this plant), trampled verges, marshy fields, short fen and esp garden lawns, on moist to dry but often compacted and poorly drained clay or loam soils, more rarely on peat, PN poor to med, base med to rich, mod acid to calc, sun to ½ shade. Tolerant of v. heavy grazing and trampling but quickly eliminated in compet with taller grasses. The best way to rid a lawn of daisy is not to mow for 3 years. Ass: *Festu rub, Agros cap, Trifo rep, Trifo dub, Prune vul, Plant lan, Hypoc rad, Luzul cam.*
Abundant in suitable habitats throughout region.

Hemp-agrimony
Eupatorium cannabinum L.



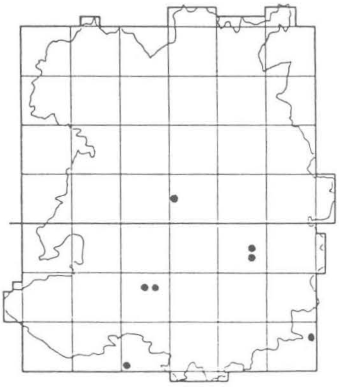
Fens and marshes, banks of streams, ditches and canals and edges of open woods, on wet to moist clay soils, often with variable water-table, PN med to rich, base med to rich, neut to calc, sun to ½ shade, sheltered. Intolerant of grazing but a strong competitor. Ass: *Filip ulm, Angel syl, Carex amis, Epilo hir, Phala aru.*
Locally frequent in NW lowlands and mid to Lower Severn Valley: sparse elsewhere and absent from higher ground.

Stinking chamomile
Anthemis cotula L.



Arable fields and waste ground on heavy, damp or winter-wet soils, PN rich, base med to rich, neut, sunny, warm. A pioneer in open weed communities on disturbed soil, often near buildings. Ass: *Bromu ste, Lamiu pur, Poa ann, Tripl ino, Urtic ure.*
Locally frequent in Lower Severn Valley; Ludlow; Church Stretton; and Much Wenlock areas: parts of NE lowland: sparse elsewhere, and absent from most of uplands.

Corn chamomile
Anthemis arvensis L.

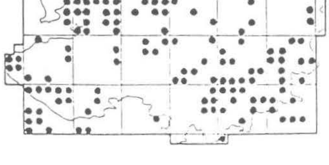


Arable fields, tracks, gateways and farmyards, on light sandy soils in warm sunny places.
Rare: the only recent records are from Cantlop Farm; Alcaston; Morville; and from v c 36 at Adforton; v c 37 near Bewdley; v c 47 on the Long Mountain.

Chamomile
***Chamaemelum nobile** (L.) All.
(*Anthemis nobilis* L.)
No recent records. Reported from Cound Brook at Boreton in *TCSVFC* 1961.

Yarrow
Achillea millefolium L.
Pastures, hay meadows, lawns, grassy verges and banks, on dry to damp but well drained soils, PN poor to med, base med to rich, mod acid to calc, sunny. One of the commonest and most characteristic members of the species-rich community in grassland of med quality. V. tolerant of grazing and trampling but holds its own in compet with mod tall grasses. Ass: *Centa nig, Holcu lan, Cynos cri, Alope pra, Ranun bul, Rumex aosa, Campa rot.*
Widespread and frequent throughout region.

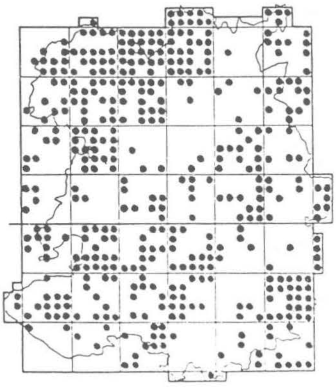
Sneezewort
Achillea ptarmica L.



Old species-rich hay meadows and pastures, fens, marshy hollows and flushes, on wet to moist poorly drained peat or clay soils with a high winter water-table, PN poor to med, base poor to med, acid to mod acid, sunny. Tolerant of light grazing and trampling. Ass: *Lotus uli, Cirsi pal, Succi pra, Juncu acu, Carex hir, Filip ulm, Stach off.*
Frequent in uplands and N Shropshire meres area: rather sparse elsewhere in lowlands.

Scentless mayweed
Tripleurospermum inodorum Schultz Bip.
(Matricaria perforata Mérat; *M. maritima* L. ssp. *inodora* (L.) Clapham)
Arable fields, gateways, verges, farmyards, rubbish tips and waste ground, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny, warm, a common annual field weed. Ass: *Papav rho, Polyg per, Viola arv, Sinap arv, Silen alb.*
Frequent in suitable habitats throughout region.

Scented mayweed, Wild chamomile
'Maythern'
Matricaria recutita L.
(*Chamomilla recutita* (L.) Rauschert; *M. chamomilla* L.pp

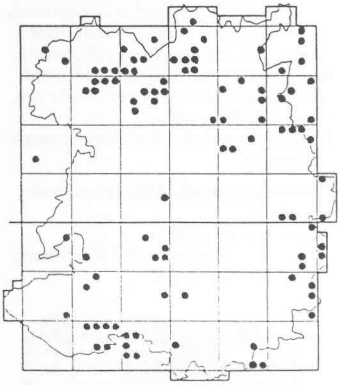


Arable fields, gateways, tracks roadside verges, farmyards, tips and waste ground, on light or heavy but well-drained, summer-dry, often winter-wet, bare soils, PN rich, base med, mod acid to neut, sunny. An opportunist pioneer of disturbed ground with a short life cycle. One of the most resistant weeds to herbicide sprays. Ass: *Ceras fon, Galiu apa, Loliu per, Capse bur, Cheno alb, Poa ann, Polyg avi, Plant maj, Tripl ino.*
Abundant throughout region, but unevenly recorded.

Pineappleweed, Rayless mayweed
***Matricaria matricarioides** (Less.) Porter (*Chamomilla suaveolens* (Pursh) Rydb.)
Introduced but thoroughly established

as a weed of cultivated ground, field edges, gateways, garden paths, wasteland and rubbish tips, on damp to dry often compacted soils, PN rich, base med to rich, mod acid to calc, sunny, warm, particularly characteristic of the pioneer community on bare but heavily trampled fertile soils. Ass: *Plant maj, Poa ann, Polyg avi, Capse bur, Stell med.*
Abundant in suitable habitats throughout region.
First recorded from Shropshire near Whitchurch c1909; 2nd record Meole Brace 1914.

Corn marigold
Chrysanthemum segetum L.

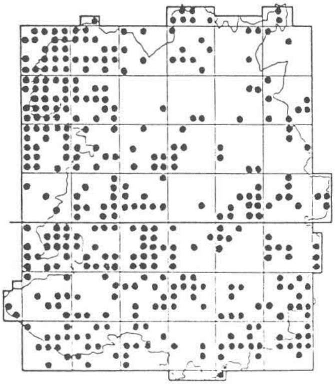


A locally profuse weed of old arable fields, much reduced by modern farming methods esp liming, but reappearing when long leys are ploughed or when ploughing extends into undisturbed field boundaries. Dry sandy or loamy soils, PN rich, base poor to med, acid, sunny. Conspicuous where it occurs but only persisting for a few years. Ass: *Anchu arv, Papav rho, Sinap arv, Viola arv, Polyg per.*
Locally frequent in N and E lowlands and lower Clun Valley: sparse elsewhere.

Oxeye daisy
'Dog daisy', 'Moon daisy'
Leucanthemum vulgare Lam.
(*Chrysanthemum leucanthemum* L.)
Old meadows, neglected pastures, open scrub, hedgebanks, cliff ledges and crevices, screes, quarries and spoil heaps, usu on limestone but also on basic igneous rocks, on dry shallow often stony soils, PN poor to med, base rich, mod acid to calc, sunny, warm, exposed. Tolerant of light grazing or mowing but persisting well in tall herbaceous vegetation. Ass: *Briza med, Festu rub, Trise fla, Centa nig, Primu ver, Linum cat, Campa rot.*
Frequent in suitable habitats throughout region.

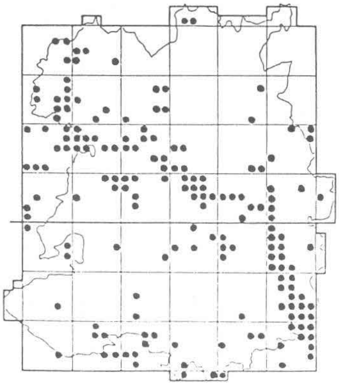
Shasta daisy
***Leucanthemum maximum** (Ramond) DC.
(*Chrysanthemum maximum* Ramond)
Naturalised in quarry above Pontesbury (1978 DD).

Feverfew
'Fitherfew'
***Tanacetum parthenium** (L.) Schultz Bip.
(*Chrysanthemum parthenium* (L.) Bernh.)



Old gardens, waste ground, crevices in old mortared walls, sites of demolished buildings, well naturalised and long established, but probably always an escape from cultivation.
Frequent in W and S of region, locally frequent to sparse in NE.

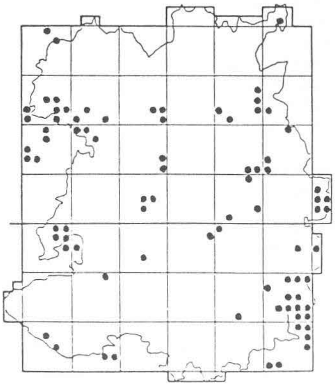
Tansy
Tanacetum vulgare L.
(*Chrysanthemum vulgare* (L.) Bernh.)



Riverbanks in tall-herb communities and in waste places and hedgebanks, on moist to damp winter-wet or flooded silt or mud, PN rich, base rich, neut, sunny, sheltered. Seldom grazed but tolerant of occasional mowing. An obvious garden escape in some localities but probably native in rough vegetation along banks of major rivers. Ass: *Artem vul, Phala aru, Impat gla, Calys sep, Rumex obt.*
Locally frequent along course of R Severn and its tributaries in NW and S of region. Mainly confined to lowland.

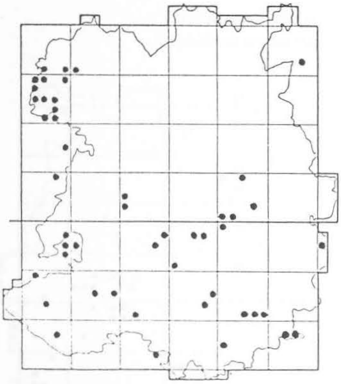
Mugwort
'Mugwood'
Artemisia vulgaris L.
Riverbanks, roadside verges, waste ground, rubbish tips, dried-up ponds, neglected hedges, on moist to damp often poorly drained and winter-wet loamy soils or clay, PN rich, base med to rich, mod acid to neut, sun to ½ shade, warm, sheltered. An important member of the tall-herb community on poorly drained but fertile soils. Ass: *Rumex obt, Urtic dio, Cirsi arv, Arrhe ela, Phala aru, Tanac vul, Calys sep.*
Frequent in suitable lowland habitats: more local in hill country and absent from higher ground.

Wormwood
Artemisia absinthium L.



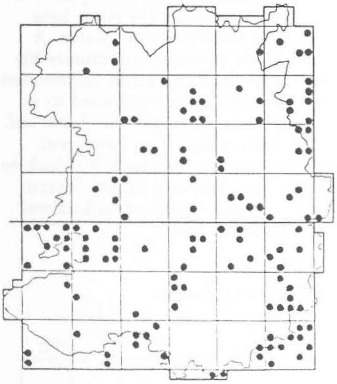
Disturbed ground, waste places, track sides, old quarries, spoil tips, sites of demolished buildings, often on limestone but not confined to it, on dry soils, PN poor to med, base rich, neut to calc, sunny, warm, sheltered. A plant of open communities of mod tall herbs, favoured by disturbance and avoiding intensive compet. Ass: *Agrim eup, Senec eru, Leuca vul, Equis arv, Trise fla.*
Locally frequent in NW and SE of region: sparse elsewhere.

Carline thistle
Carlina vulgaris L.
Rocky banks and species-rich grassland, stable screes and old limestone quarries, on shallow, usu dry stony soils, PN poor, base med to rich, mod acid to calc, sunny, warm, exposed. Favoured by heavy grazing though not intensive grazing, a poor competitor except in short turf. Ass: *Linum cat, Thymu pra, Festu ovi, Hiera pil, Aphan arv, Carex car, Luzul cam.*
Commonest in limestone areas but also on other basic rocks as at Earl's Hill:



locally frequent in Oswestry uplands: sparse elsewhere in hill country and absent from lowlands.

Great burdock
Arctium lappa L.



Tall coarse vegetation on banks of rivers and streams, roadside verges, waste places and open scrub, on damp to dry soils, PN rich, base med, mod acid to neut, sunny, warm. Ass: *Rumex obt, Arrhe ela, Cirsi arv, Elymu rep, Brass nig, Bromu ste, Dipsa ful.*
Mainly a lowland species commonest along banks of R Severn and major tributaries.

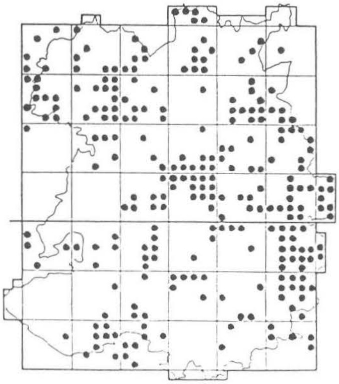
Lesser burdock
Arctium minus Bernh. agg.

Clearings and rides in woodland, open scrub, hedgebanks, waste places, edges of fields, neglected gardens, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sun to shade. Sspp. **minus, pubens** (Bab.) Arènes and **nemorosum** (Lej.) Syme have all been recorded in the region, but not consistently mapped nor differentiated ecologically. Ssp. *minus* appears to be the commonest; ssp. *nemorosum* is rare: recorded from Pulverbatch (1894 Benson); v c 47 Breidden (1962 FHP); and v c 50 Redbrook (1979 G Ellis).
Frequent throughout region except at highest altitudes.

Slender thistle
Carduus tenuiflorus Curtis

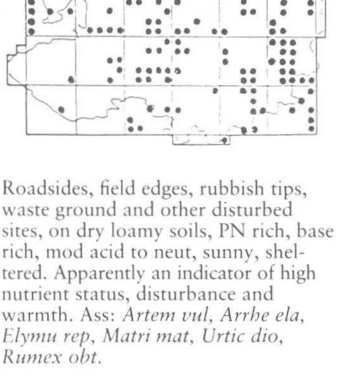
Among grasses beside track near Harnage (1975 PP). Also in v c 50 in a grassy field near Chirk (1980 BD).

Musk thistle
Carduus nutans L.



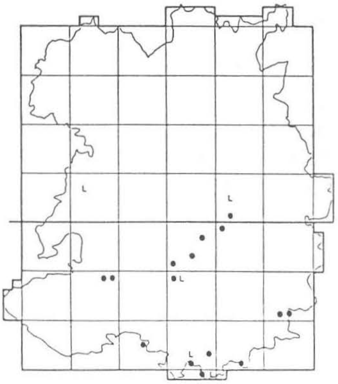
Arable fields and pastures, verges, rubbish tips and waste ground, on dry soils, PN med to rich, base rich, neut to calc, sunny, exposed. A particularly characteristic invader of fields recently disturbed and heavily limed, seldom persisting long. Ass: *Echiu vul, Cirsi vul, Resed ltea, Papav rho, Matri rec, Rumex cri.*
Locally frequent in lowlands and low lying areas in hill country: less common on the higher ground.

Welted thistle
Carduus acanthoides L.
(*C. crispus* auct., non L.)



Roadsides, field edges, rubbish tips, waste ground and other disturbed sites, on dry loamy soils, PN rich, base rich, mod acid to neut, sunny, sheltered. Apparently an indicator of high nutrient status, disturbance and warmth. Ass: *Artem vul, Arrhe ela, Elymu rep, Matri mat, Urtic dio, Rumex obt.*
Frequent in NW: locally frequent in low lying parts of hill country and Lower Severn Valley: sparse in NE plain and higher uplands.

Woolly thistle
'Tiger-thistle'
Cirsium eriophorum (L.) Scop.



Pastures and rough grassy places, track sides, old quarries and banks, on limestone, on shallow stony dry soils, PN poor to med, base rich, neut to calc, sunny, warm, often ungrazed. Ass: *Fraga ves, Hyper per, Linum cat, Trise fla, Clino vul, Galiu mol, Hyper hir, Senec eru.*
Very locally frequent along Wenlock Edge: scattered elsewhere in S of region chiefly on limestone outcrops. Little decrease over past century.

Spear thistle
Cirsium vulgare (Savi) Ten.

Grasslands, edges of cultivated fields, roadside verges, waste ground, open scrub, on dry to damp but well drained soils, PN med to rich, base med, mod acid to neut, sunny. A common weed of grassy habitats but not as difficult as creeping thistle to eradicate. Ass: *Cirsi arv, Rumex obt, Rumex cri, Urtic dio, Loliu per, Trifo rep.*
Frequent throughout region.

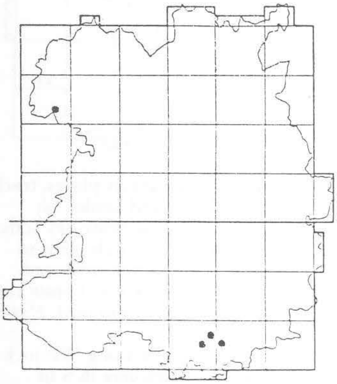
Marsh thistle
Cirsium palustre (L.) Scop.

Poorly drained pasture, wet hollows in fields, ditch banks, stream sides, fen, open scrub, moorland, on wet to damp soils with high or variable water-table and some water movement, often on peat, PN poor to rich, base med to rich, acid to calc, sun to ½ shade, tolerant of grazing and trampling. A species of wide ecological range but generally indicating poorly drained ground. Ass: *Rumex aosa, Succi pra, Senec aqu, Desch cae, Calth pal, Molin cae, Holcu lan.*
In some populations white flowers are almost as common as purple and intermediate colours occur.
Frequent throughout region esp in uplands.

Creeping thistle, Field thistle
'Dogers'
Cirsium arvense (L.) Scop.

Grassland and cultivated fields, verges and hedgebanks, open scrub, waste places, rubbish tips, tracks, neglected gardens, on dry to damp but well drained soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. A persistent and troublesome weed particularly in improved grassland, over-grazed pasture and under-managed arable land. Ass: *Cirsi vul, Rumex obt, Rumex cri, Urtic dio, Plant maj, Trifo rep, Loliu per.*
Frequent to abundant throughout region.

Dwarf thistle, Stemless thistle
Cirsium acaule Scop.

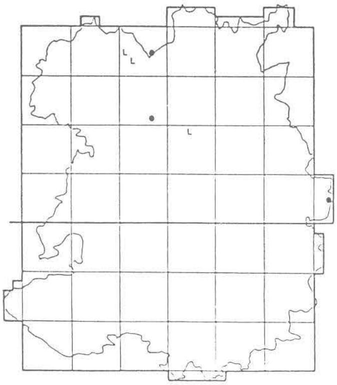


Old limestone pasture, grassy banks and open scrub on shallow stony, dry soils, PN poor, base rich, calc, sunny, warm, exposed. Ass: *Briza med, Cynos cri, Festu ovi, Brach syl, Sangu min, Plant med, Lotus cor, Thymus pra, Carex car.*
This species needs prolonged spells of warm weather in July and August to ripen its seed. The long established colonies in this region are outliers from the main British distribution, perhaps reflecting the rare occurrence of suitable conditions for propagation by other than vegetative means.
V. rare: Llanymynech Hill on both sides of Welsh border; SW slopes of Clee Hill.

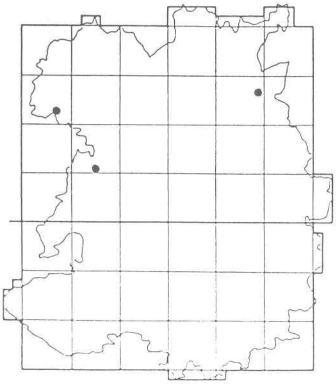
Meadow thistle, Marsh plume thistle
Cirsium dissectum (L.) Hill

Fens and marshy pastures, on wet peat or water-logged soil, PN poor, base med, mod acid, sunny, sheltered. A rare member of the med tall herbaceous community of old poorly drained meadows. Ass: *Molin cae, Myric gal, Galiu pal, Succi pra, Plata bif, Poten pal, Carex pcea.*
Rare: Wem Moss; Beamish near Albrighton; and reported from Merrington Green but not confirmed. Formerly known from a few additional sites in Ellesmere and Shrewsbury areas.

(Map: next column)

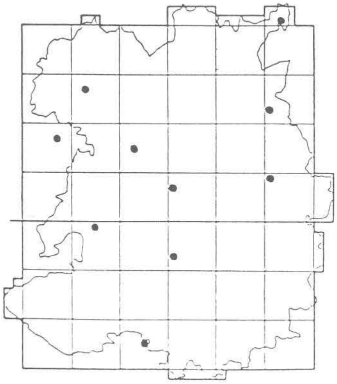


Milk thistle
***Silybum marianum** (L.) Gaertner



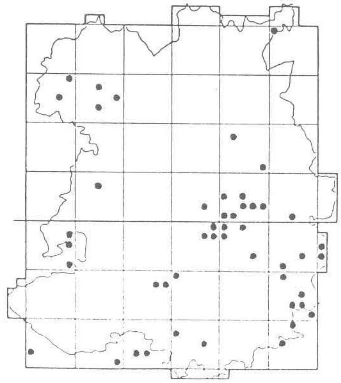
An occasional colonist of disturbed ground and grassy banks.
Recorded from Hinstock; Halfway House; and Pant.

Cotton thistle, Scotch thistle
***Onopordum acanthium** L.



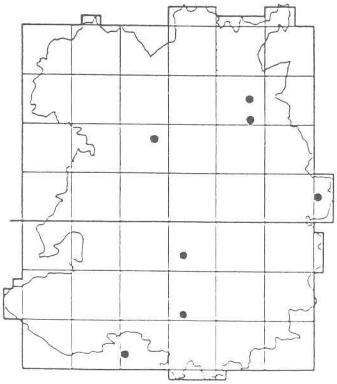
Casual but fairly persistent on disturbed ground, rubbish tips, waste land, market gardens and near farm buildings, possibly coming in with manure or contaminated straw.
Scattered throughout region.

Greater knapweed
Centaurea scabiosa L.



Verges, rough grassland, open scrub, limestone quarries, spoil heaps, on dry shallow stony soils, PN poor, base rich, neut to calc, sunny, warm. A plant of the tall-herb community between grassland and scrub, commonest on limestone but not confined to it. Ass: *Agrim eup, Hyper hir, Scabi col, Artem abs, Sangu min, Leuca vul.*
Locally frequent in Much Wenlock to Ironbridge area; and Lower Severn Valley: sparse elsewhere in Ludlow and Oswestry areas.

Cornflower
Centaurea cyanus L.



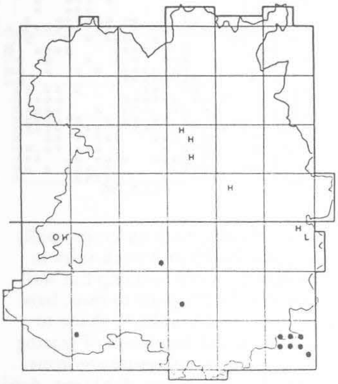
Arable fields, old haymeadows and waste ground, on dry soils, PN poor to med, base med to rich, neut to calc, sunny, warm. A field weed much reduced by modern farming methods but still surviving in a few favoured localities.

Common knapweed
'Hardhead', 'Shaving-brush'
Centaurea nigra L.
(incl. *C. obscura* Jordan
& *C. nemoralis* Jordan)

Old pastures, rough grassland, road-

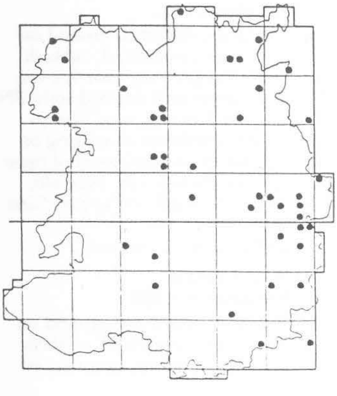
side verges, hedgebanks, edges of fields, waste ground, open scrub, grassy moorland, on dry to damp but well drained soils, PN poor to med, base med to rich, acid to calc, sun to ½ shade. Tolerant of heavy grazing and trampling but also persisting in taller vegetation. A widespread and successful associate of grasses on relatively impoverished soils. Ass: *Arrhe ela, Alope pra, Dacty glo, Festu rub, Agros cap, Rumex aosa, Leuca vul, Lathy pra, Linar vul.*
Genetically varied and ecologically wide-ranging; the segregates have not been distinguished.

Saw-wort
Serratula tinctoria L.



Old species-rich grassland, open scrub, grassy banks of streams and tracks, on moist to damp soils, with high or variable water-table and some lateral movement, PN poor, base poor to med, acid to mod acid, sun to ½ shade, sheltered. Ass: *Stach off, Succi pra, Genis tin, Lathy mon, Poten ere.*
V. locally frequent in Wyre Forest area (most records not in v c 40): scattered records elsewhere: Ticklerton; a field on Sutton Hill near Hayton's Bent; and Hobharris Wood near Chapel Lawn. Formerly at other scattered localities in N Central Shropshire.

Chicory
***Cichorium intybus** L.



Disturbed ground on roadsides, hedgebanks, wasteland, edges of fields, on dry soils, PN med to rich, base med, mod acid to neut, sunny. Sometimes sown in grass mixtures as a fodder plant which may persist for several years.
Locally frequent in Badger area: sparse elsewhere in the lowland and rare in the hills.

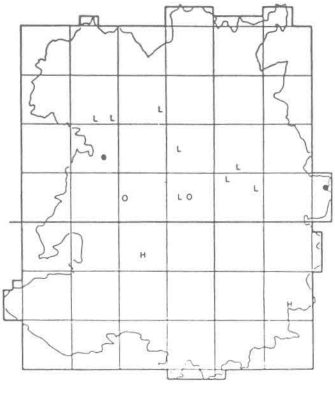
Nipplewort
Lapsana communis L.

Rides and edges of woods, open scrub, shaded banks, stony slopes, waste ground, rubbish tips, old walls, neglected gardens, on dry loamy soils, PN rich, base poor to med, acid to neut, ½ shade, ungrazed. A pioneer of disturbed ground and shady but nutrient rich soil. Ass: *Chame ang, Poa nem, Geran rob, Glech hed, Digit pur, Stach syl.*
Frequent throughout region except at highest altitudes.

Cat's-ear
Hypochoeris radicata L.

Grassland, heathland, moorland, open scrub, hedgebanks, verges, waste ground, field edges, lawns, on dry to damp but well drained often sandy soils, PN poor to med, base poor to rich, acid to neut, sun to ½ shade. Tolerant of heavy grazing and trampling but persisting in taller vegetation. One of the most successful and ecologically tolerant associates of grasses on the less fertile soils.
Ass: *Centa nig, Rumex aosa, Plant lan, Leont aut, Agros cap, Festu rub.*
Frequent throughout region.

Smooth cat's-ear
Hypochoeris glabra L.



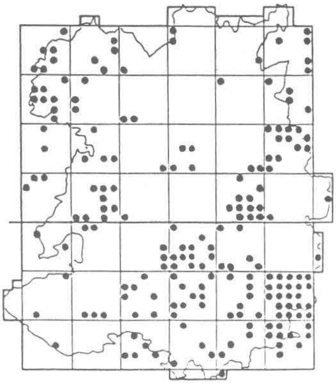
Dry rocky hillsides, heathland, poor pastures, on shallow stony or sandy soils, PN poor, base med, mod acid to neut, sunny, warm, exposed. A rare and inconstant member of the community of pioneer annuals colonising bare patches of ground. Ass: *Filag min, Rumex alla, Jasio mon, Aphan mic, Senec syl, Hiera pil.*

Rare: Loton Park (1976 SS); White Ladies, Boscobel (1976 BRF). Also recorded from SE slopes of Earl's Hill Nature Reserve (1963 CAS). Formerly known from a number of sites in N Shropshire lowlands.

Autumn hawkbit
Leontodon autumnalis L.

Species-rich grassland, open scrub, heath, moorland, hedgebanks and verges, stream banks, fens and flushes, on moist to damp soils, PN poor, base poor to rich, acid to neut, sun to ½ shade. Tolerant of grazing and trampling but fairly persistent in taller vegetation. Almost as wide-ranging as cat's-ear but favoured by damper conditions. Ass: *Stach off, Succi pra, Ranun fla, Carex ova, Carex hir, Lychn flo, Galiu pal.*
Frequent throughout region esp uplands.

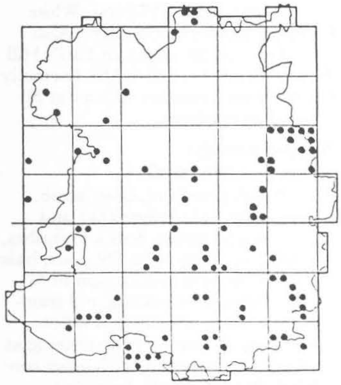
Rough hawkbit
Leontodon hispidus L.



Old species-rich grassland, hedgebanks, verges, limestone quarries and spoil heaps, on dry shallow stony soils, PN poor to med, base rich, neut to calc, sunny, warm, exposed. Tolerant of heavy grazing but a poor competitor with tall grasses. Ass: *Briza med, Linum cat, Plant med, Primu ver, Hiera pil, Daucu car.*
Locally frequent in uplands of W and S and in Lower Severn Valley: sparse elsewhere and absent from much of NE plain.

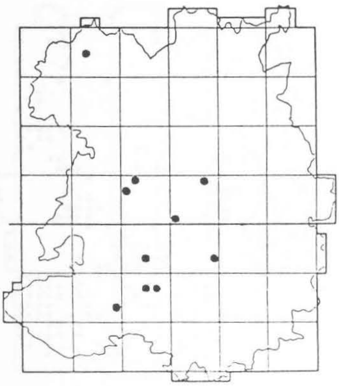
Lesser hawkbit
Leontodon taraxacoides (Vill.) Mérat (*L. leysseri* G. Beck)

Open turf and bare patches in grassland, stony banks, limestone and other basic rock outcrops, quarries and old spoil, trackways, on dry to damp, shallow soils, PN med, base rich, mod acid to calc, sunny, warm. A pioneer plant tolerant of grazing and trampling, persistent in close-cropped pasture, not always calcicole. Ass: *Briza med, Carex car, Cynos cri, Festu ovi,*



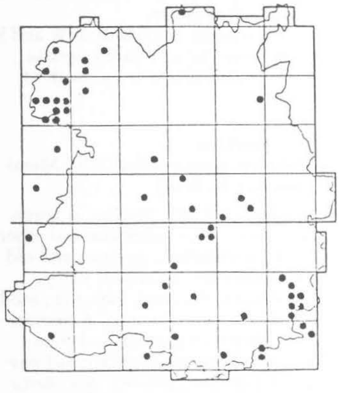
Linum cat, Thymu pra, Tarax lae.
Locally frequent in SE half of region: sparse in W and N.

Bristly oxtongue
***Picris echioides** L.



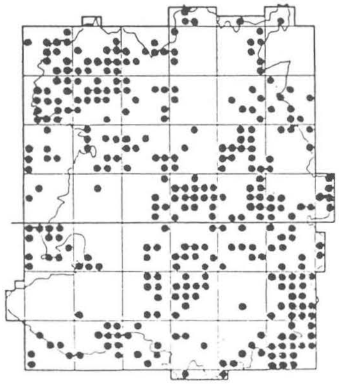
Casual but occasionally persistent on roadsides, banks of canals and streams and other disturbed ground.
In scattered localities mainly in S and W of region. Increasing?

Hawkweed oxtongue
Picris hieracioides L.



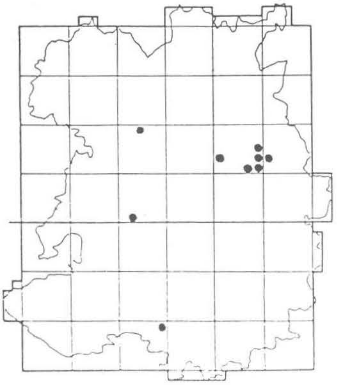
Grassy places, open scrub, limestone quarries, disturbed ground and roadside verges, on dry, generally shallow stony soils, PN poor, base rich, neut to calc, sunny. Intolerant of heavy grazing and a poor competitor in dense vegetation. Ass: *Cardu nut, Leuca vul, Leont his, Inula con, Briza med, Clino vul.*
Locally frequent in Oswestry area; Wenlock Edge; and Lower Severn Valley: sparse elsewhere and mainly on limestone.

Goat's-beard, Jack-go-to-bed-at-noon
Tragopogon pratensis L.



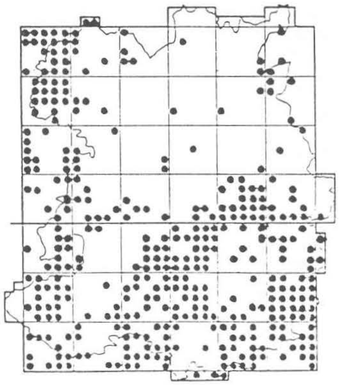
Verges, hedgebanks, waste places, edges of fields and disturbed ground, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm, exposed. Often among tall grasses but tolerant of occasional mowing. Ass: *Silen alb, Arrhe ela, Elymu rep, Sisym off.*
Frequent throughout lowland and in warmer valleys of upland but absent from the higher ground.

Prickly lettuce
***Lactuca serriola** L.



Introduced but persistent on roadsides, banks, railway tracks and waste ground.
Locally frequent in the NE part of Telford and at the Alscott Sugar-beet Factory; near Picklescott; Stanton Lacy; also seen recently near Fitz Mill and Montford Bridge. Probably increased over past half century: first recorded near Buildwas Station 1924.

Wall lettuce
Mycelis muralis (L.) Dumort.



Sheltered cliffs, rock outcrops, walls and stony banks and track sides in woodland, on dry to damp but well drained soils, PN poor to med, base rich, mod acid to calc, ½ shade to shade, sheltered. Intolerant of grazing and of compet with more vigorous herbs. Ass: *Teucr sco, Asple rut, Asple tri, Geran rob, Lapsa com.*
Frequent in the hill country on basic rocks: rare elsewhere.

Perennial sow-thistle
Sonchus arvensis L.

Arable fields, roadside verges, waste ground, rubbish tips, on dry to damp but well drained soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Occasionally a troublesome weed of cereal crops and difficult to eradicate from cracks in concrete. Ass: *Elymu rep, Cirsi arv, Rumex cri, Arrhe ela, Avena fat.*
Frequent throughout region except at higher altitudes.

Smooth sow-thistle
Sonchus oleraceus L.

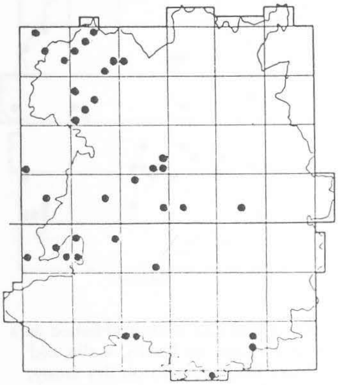
Edges of fields, disturbed ground on roadside verges, wasteland, rubbish tips, neglected gardens, quarries, on dry to damp but well drained soils, PN rich, base med to rich, mod acid to calc, sunny. Intolerant of grazing or mowing but an invasive weed of open ground. Ass: *Rumex obt, Silen alb, Urtic dio, Cheno alb, Polyg per, Cirsi vul.*
Frequent throughout region.

Prickly sow-thistle
Sonchus asper (L.) Hill

Edges of fields, disturbed ground on roadside verges, wasteland, rubbish tips, neglected gardens, quarries, on

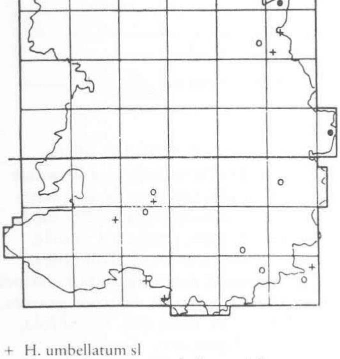
dry to damp but well drained soils, PN rich, base med to rich, mod acid to calc, sunny, intolerant of grazing or mowing but an invasive weed of open ground. Ass: *Rumex obt, Silen alb, Urtic dio, Cheno alb, Polyg per, Cirsi vul.*
Frequent throughout region.

Blue sow-thistle
***Cicerbita macrophylla** (Willd.) Wallr.



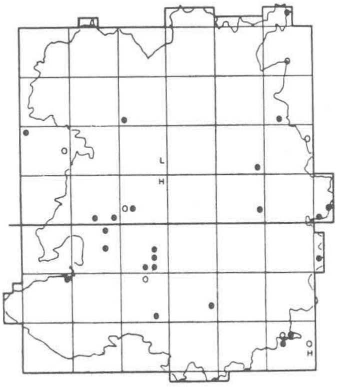
Introduced and well established on roadsides, pond margins, riverbanks and old gardens, usu among tall vegetation. Numerous scattered localities mainly in NW quarter of region. First recorded near Shrewsbury 1923.

Hieracium umbellatum L.
Heathland, disturbed ground on roadside verges, railway banks, on dry to damp soils, PN poor, base poor to med, acid, sunny, ungrazed.
Scattered records chiefly in S and E of region.
Ssp. **bichlorophyllum** (Druce & Zahn) P.D. Sell & C. West. Recorded by BRF from three localities in the NE.
Ssp. **umbellatum**



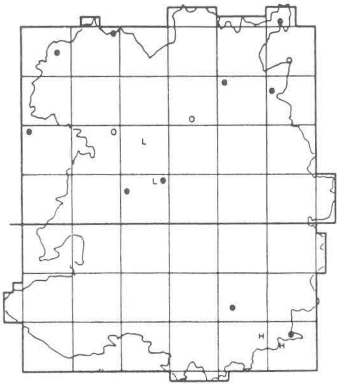
+ H. umbellatum sl
○ H. umbellatum ssp umbellatum (all pre-1970)
● H. umbellatum ssp bichlorophyllum

Hieracium sabaudum L.
(incl. *H. perpropinquum* (Zahn) Druce and *H. bladonii* Pugsley)



Woodland glades, shaded rocky banks and roadsides, on dry stony or sandy soils, PN poor, base medium mod acid, ½ shade, ungrazed. Ass: *Lathy mon, Hyper pul, Solid vir, Luzul pil, Desch fle.*
Locally frequent near Church Stretton and Pontesbury: sparse elsewhere.

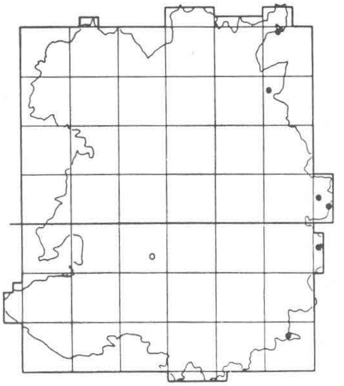
Hieracium vagum Jordan



Open woodland, railway sidings, cuttings and embankments, hedgebanks and roadside verges, on dry stony or sandy soils, PN poor, base poor to rich, acid to neut, sun to ½ shade, ungrazed but sometimes mown. Scattered records mainly in N and SE corner of region.

***Hieracium salticola** (Sudre) P.D. Sell & C. West
Recorded by BRF from the sides of roads and railways at a number of places on the E edge of the region, into which it seems to be spreading from the Birmingham area. First record at Hope Bowdler (1955 A Martin).

(Map: next column)



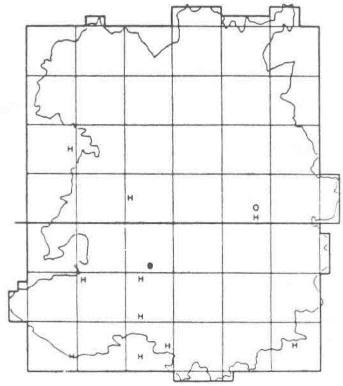
Hieracium eboracense Pugsley
Recorded by A. Ley in 1909 from Buildwas and Diddlebury.

Hieracium trichocaulon (Dahlst.) Johans.
Recorded but unconfirmed from Onibury and Clee St Margaret.

Hieracium pellucidum Laest.
One isolated record for SO 47 in *CSABF.*

***Hieracium sublepistoides** (Zahn) Druce
(*H. exotericum* auct. pp)
Recorded for SJ 41 and SO 77 in *CSABF.*

Hieracium cinderella (A. Ley) A. Ley
(*H. exotericum* auct. pp)

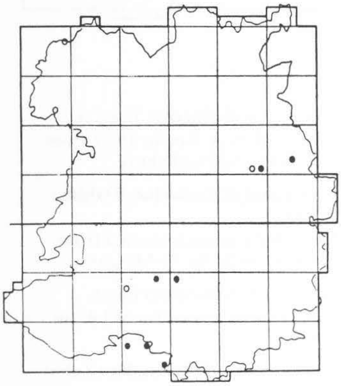


This plant, whose British distribution is centred on Herefordshire and S Shropshire, was surprisingly seen only once during the present survey: in 1979 by HMD near Marshbrook, on steep wooded bank to road.
The latest previous find was by EMR in 1956 on Benthall Edge. Between 1896 and 1913 it was recorded from

the Skin Mill cottage in the Habberley Valley near Pontesford; Willey Lodge; Bishops Castle Wood; Horderley lane ½ mile from Marshbrook; Stoke Wood, Stokesay; and Whitcliffe Wood, Ludlow. Aso from Craig Breidden (v c 47); Downton Gorge (v c 36); and Wyre Forest (v c 37).

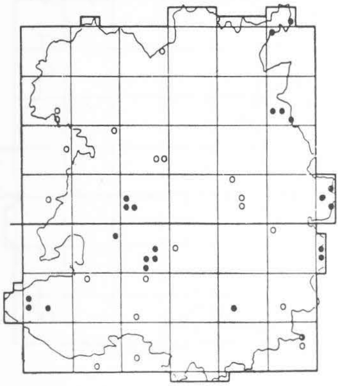
†**Hieracium subcrassum** (Almq. ex Dahlst.) Johans.
Recorded once on a roadside near Marshbrook, in a site subsequently destroyed. Known from only two other localities in Britain.

Hieracium vulgatum Fries



Grassy and rocky banks, quarries and walls. Rather sparse, but near the southern limit of its British range in this region.

Hieracium acuminatum Jordan
(incl. *H. lachenalii* auct. and *H. strumosum* auct.)



Rock outcrops and stable screes esp of dolerite, stony banks, roadsides, railway tracks and quarries, on dry stony or sandy soils, PN poor, base med to rich, mod acid to calc, sun to ½ shade, seldom grazed and a poor competitor with vigorous grasses. Ass: *Teucr sco, Hiera pil, Jasio mon, Digit pur, Festu ovi.*

The commonest 'true' hawkweed in the region, frequent wherever suitable habitats occur.

Hieracium diaphanum Fries
(incl. *H. anglorum* (A. Ley) Pugsley)
Seen once during the present survey, in Pulverbatch lanes (ICT). Recorded early in the century from the Wrekin; Benthall Edge; Marshbrook. Also from Downton Gorge woods (v c 36); and from Craig Breidden (v c 47) in 1951 and 1953.

$**Hieracium saxorum** (F. J. Hanb.) P.D. Sell & C. West
Recorded from Craig Breidden (v c 47) in 1950.

Hieracium lasiophyllum Koch
Crags, crevices, ledges and stable screes of dolerite and other hard basic rocks, dry, PN poor, base rich, mod acid to neut, sunny, warm, exposed, ungrazed. Ass: *Umbil rup, Asple adi, Geran san, Teucr sco, Festu ovi.*
Rare: SE slopes and crags of Earl's Hill (1961 and since, CAS); Craig Breidden (v c 47 1951 and since, C West). First recorded from Earl's Hill – probably, though given as "Pontisbury Hill" – in 1888; another early record in 1909 from a rock at the head of Cardingmill Valley.

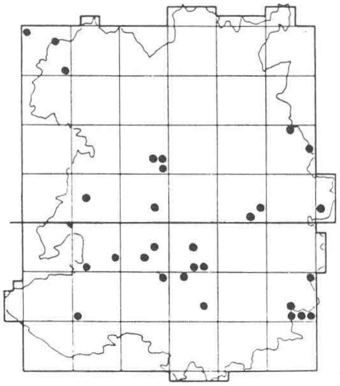
$**Hieracium carneddorum** Pugsley
Recorded from rocky ledges on Craig Breidden (v c 47) by PDS in 1953.

$**Hieracium anglicum** Fries
v c 47.
Recorded from Craig Breidden in 1951 by C West, where it reaches its southern limit in Britain.

Mouse-ear hawkweed
Hieracium pilosella L.
Grassy banks, bare patches in pasture, sunny slopes and rock outcrops, on dry often shallow soils, PN poor, base poor to rich, acid to calc, sunny, warm, exposed. Tolerant of grazing, trampling, disturbance and drought, often wilting in dry weather but recovering. A poor competitor with vigorous grasses. Ass: *Thymu pra, Festu ovi, Agros cap, Veron off, Hypoc rad, Jasio mon, Galiu ver.*
Frequent in hill country, local in lowlands but not an exclusively upland species.

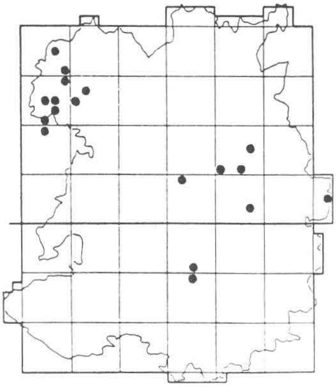
Greater mouse-ear hawkweed
$**Hieracium peleteranum** Mérat
Not in v c 40.
Rock ledges, screes and stony slopes, on dry shallow soils over dolerite, PN poor, base med, mod acid, sunny, warm, exposed, v. tolerant of drought, wilting but recovering, intolerant of shade. Ass: *Erica cin, Callu vul, Festu ovi, Helia num, Teucr sco, Aira pra, Teesd nud.*
V. rare: Breidden Hill (v c 47), where it is locally frequent at mid altitudes, but replaced by *H. pilosella* near the summit.

Fox-and-cubs, Orange hawkweed
'Grim the Collier'
***Hieracium brunneocroceum** Pugsley
(incl. *H. aurantiacum* L.)



Naturalised and well established as a garden escape on banks, walls, old railway lines etc, usu on dry stony, base-rich soils.
Locally frequent in Oswestry; Shrewsbury; Telford; S uplands; and Lower Severn Valley.

Beaked hawk's-beard
***Crepis vesicaria** L.
ssp. **haenseleri** (DC.) P.D. Sell
(*C. taraxacifolia* Thuill.)



Grassy banks, disturbed roadside verges, old railway sidings and waste ground, on dry stony soils, usu limestone (incl railway ballast), PN med, base med to rich, mod acid to calc, sunny, warm, sheltered. Tolerant of light grazing or mowing and of compet with all but the most vigorous grasses. Ass: *Sisym off, Silen alb, Resed lola, Arrhe ela, Equis arv.*
Locally frequent in Oswestry area: scattered records around Telford and in S or region.

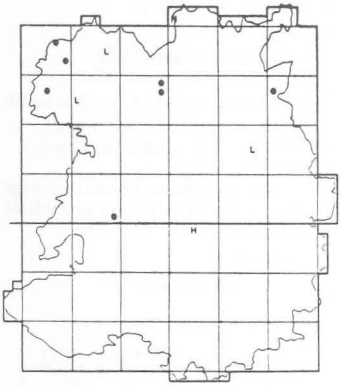
Rough hawk's-beard
***Crepis biennis** L

Roadside on railway bridge near Llanyblodwel (1959 EMR), still there 1984 (CAS); unconfirmed records Dudmaston Hall (1973); Knowbury (1977 CR).

Smooth hawk's-beard
Crepis capillaris (L.) Wallr.

Grassy banks, disturbed roadside verges, bare patches in pasture and thinly seeded leys, waste ground and tracks, on damp to dry soils, PN poor to rich, mod acid to calc, sunny, warm, tolerant of mod grazing and trampling. An early colonist and a poor competitor in closed vegetation. Ass: *Festu rub, Loliu per, Agros ten, Plant lan, Trifo rep, Vicia sat, Ceras fon.* Widespread and common throughout region at all altitudes.

Marsh hawk's-beard
Crepis paludosa (L.) Moench



Wet meadows, calcareous fens and spring flushes, on wet to moist peat or mud with some movement of water in soil, PN poor to med, base rich, neut to calc, sun to ½ shade, sheltered, cool. Tolerant of annual mowing but not of heavy grazing, persists in fairly dense and tall grassy vegetation. Ass: *Lychn flo, Carex pcea, Valer dio, Troll eur, Calth pal, Polyg bis, Juncu art, Lotus uli.*
Local in valley meadows in Oswestry area and scattered on N Shropshire plain: one record in Habberley Valley.

Dandelion
Taraxacum Weber

Dandelions have not been thoroughly studied in this region. Those collected by B R Fowler (mainly in the E) have been determined by Dr A J Richards. Several species in Section *Erythrosperma* are recorded from the Llanymynech area of v c 47 in *FPW*. Most of the information below, however, was kindly supplied by Mr Tom Edmondson of Chester, based on collections of 33 taxa made a few years ago. He writes "Our knowledge of dandelion taxonomy is being slowly revised . . . The enclosed list is, however, sound and I have excluded some widespread species which, we suspect, have been incorrectly named. 'Oellgaard of Denmark has recently supplied the names *horridifrons* and *rhamphodes* [without authorities]. 'By comparison with Cheshire and E Clwyd, one would expect 60 to 70 taxa in Shropshire other than casuals and adventives. From our knowledge of the NW and NW Midlands the list is of the species which one would expect to find by casual exploration of broad untrammeled verges, old lane banks, etc. *T. pectinatiforme* is perhaps a local Midland species."

Section ERYTHROSPERMA Dahlst.
From TE:
T. lacistophyllum (Dahlst.) Raunk. SJ4233, 5828, 5541, also BRF (1977) "roadside bank SO810950"
From BRF det. AJR:
T. laetiforme Dahlst. "(1978) N-facing mortared wall by roadside SJ707284"
From *FPW*:
T. brachyglossum (Dahlst.) Dahlst. (pre-1950) SJ21
T. rubicundum (Dahlst.) Dahlst. SJ22
T. silesiacum Dahlst. ex G. Hagl. SJ22
T. proximum (Dahlst.) Dahlst. SJ22
T. fulviforme Dahlst. SJ22
T. oxoniense Dahlst. SJ21,22
T. glauciniforme Dahlst. SJ21,22

Section SPECTABILIA Dahlst.
T. spectabile Dahlst. SJ4233 (TE), also BRF (1979) "species-rich meadow, Albrighton SJ822036"

From BRF det. AJR:
T. landmarkii Dahlst. (1979) "sandy pasture SO807931"

Section NAEVOSA
T. euryphyllum (Dahlst.) M.P.Chr. SJ4233, 7521 (TE) also BRF (1978) "mortared wall in field SJ740222"
T. naevosiforme Dahlst. SJ3927.

Section CELTICA
T. nordstedtii Dahlst. SJ4233 (TE), also BRF (1978) "species-rich meadow SJ823036"

From TE:
T. raunkiaerii Wiinst. SJ8212
T. subbracteatum A. J. Richards SJ4233

Section TARAXACUM
From TE:
T. aequilobum Dahlst. SO7293
T. alatum H. Lindb. f. SJ2932, 4233 5739
T. ancistrolobum Dahlst. SJ7321
T. aurosulum H. Lindb.f SJ7321
T. cophocentrum Dahlst. SJ6727
T. croceiflorum Dahlst. SJ4034, 5739, 6727
T. ekmanii Dahlst. SJ2627, 5640
T. expallidiforme Dahlst. SJ5541
T. fasciatum Dahlst. SJ7220
T. horridifrons SJ4822, 6233
T. latisectum H. Lindb.f. SJ2932, 4233, 4433, 6029
T. linguatum M.P. Chr. & Wiinst. SJ3927, 4822, 4234, 6233
T. lingulatum Markl. SJ4034, 5223, 6526, 7220
T. mericyclum A. J. Richards SJ4822, 4034, 7223
T.pannucium Dahlst. SJ5522, 5541, 6328
T. pectinatiforme H. Lindb.f. SJ4822, 5828
T. percrispum M.P.Chr. SJ7120
T. procerisquameum H. Oellgaard SJ7220
T. rhamphodes SJ4329, 4433, 5541
T. sellandii Dahlst. SJ4034, 5433
T. subpraticola G. Hagl. SJ5634, 5640
T. undulatiflorum M.P.Chr. SJ5640

From BRF det. AJR:
T. cordatum Palmgren (1979) "railway ballast near Woore SJ735408"
T. dahlstedtii H. Lindb.f. (1979) "roadside layby near Woore SJ742424"
T. subcyanolepis M.P.Chr. (1979) "disturbed ground by field pond SJ718313"

From *FPW*:
T. valdedentatum Dahlst. SJ21

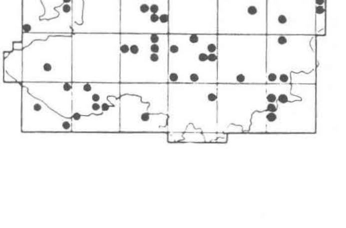
Section HAMATA
From TE;
T. atactum Sahlin & van Soest SJ2732
T. hamatum Raunk. SJ4232
T.lamprophyllum M.P.Chr. SJ4433, 5433, 5635, 5640
T. pseudohamatum Dahlst. SJ2732, 5433

From BRF det. AJR:
T. marklundii Palmgren (1978) "roadside verge SO810950"

Ecological notes on Sections Erythrosperma and Taraxacum:

Lesser dandelion

Section **Erythrosperma**
(*Taraxacum laevigatum* (Willd.) DC. agg.)



Open patches in old grassland, stony slopes, rock outcrops, quarries and disturbed ground, on dry shallow soils usu over limestone or other basic rocks, PN poor to med, base med to rich, mod acid to calc, sunny, warm, exposed. Tolerant of heavy trampling, often associated with rabbit activity but a poor competitor with tall grasses. Ass: *Hiera pil, Festu ovi, Galiu ver, Aphan arv, Eroph ver, Aira car, Carex car, Rumex alla.*
Frequent in W and S uplands: locally frequent on light sandy soils in the plain but rare on clay.

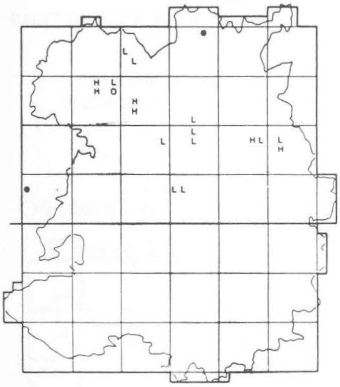
Dandelion
Section **Taraxacum**
(*T. officinale* Weber agg.)

Verges, hedgebanks, pastures, open scrub, banks of ponds and rivers, paths, waste ground, gardens and parks, on moist to dry soils, PN med to rich, base med to rich, acid to calc. Tolerant of a wide range of conditions and forms of disturbance, particularly characteristic of the verge zone immediately bordering a road and thus most affected by mowing, compaction and pollution. Ass: *Planta maj, Poa ann, Poa tri, Ranun rep, Polyg avi, Trifo rep, Agros sto, Plant lan, Hypoc rad.*
Widespread and abundant throughout region.

Monocotyledones

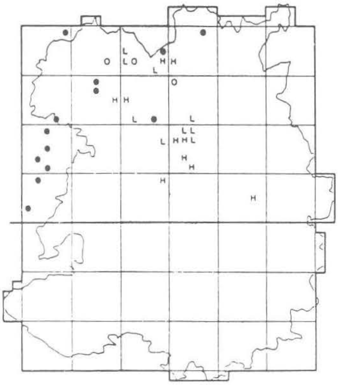
WATER-PLANTAIN FAMILY ALISMATACEAE

Lesser water-plantain
Baldellia ranunculoides (L.) Parl.



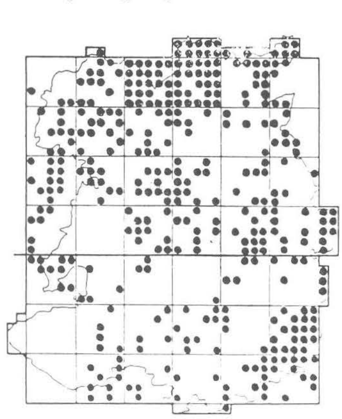
Shallow pools and ditches, on peat or sand in clear water with variable level, often dry at surface in summer, PN poor, base med to poor, mod acid to neut, sunny, sheltered. Intolerant of fertilisers and of compet with vigorous water plants. Ass: *Eleog flu, Poten pal, Oenan fis, Carex pse, Sparg min, Ranun fla.*
V. rare: Brown Moss; pond at Powis Castle (v c 47).
Formerly in many localities across N Shropshire plain. Severe decrease due to drainage and agricultural improvement. Endangered.

Floating water-plantain
Luronium natans (L.) Rafin.



Moderately shallow pools and disused canals, in clear water rooted in organic mud or peat, occasionally dry at surface in summer, PN poor to med, base poor to rich, acid to calc, sunny, sheltered. Apparently intolerant of waters rich in phosphate and nitrate, perhaps through compet with more vigorous plants, but fairly indifferent to pH. Ass: *Calli ham, Calli her, Potam cri, Potam obt, Ranun aqu, Lemna tri.*
Rare: pools at Brown Moss; various reaches of disused canal near Aston Locks; and from Llanymynech to Welshpool. Formerly much more widespread in central area of N Shropshire plain where the decrease is due to drainage and agricultural improvment, but increased in canals.

Water-plantain
Alisma plantago-aquatica L.



Slow flowing rivers, canals, ponds and lakes, artificial or natural, in shallow water occasionally dry at surface, rooted in mud or silt, PN rich, base rich, neut to alk, sun or ½ shade. Often a pioneer species germinating abundantly on disturbed trampled or flooded mud but tolerant of compet with taller emergent plants. Ass: *Sparg ere, Myoso sco, Veron bec, Lythr sal, Biden cer, Biden tri, Ranun sce.*
Locally abundant to frequent throughout lowlands: less common in uplands and absent at higher altitudes.

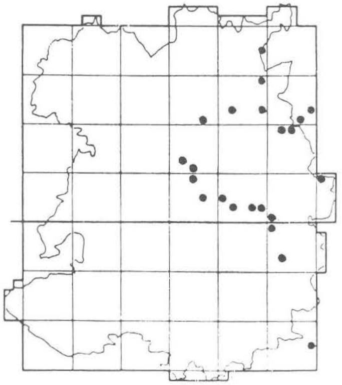
Narrow-leaved water-plantain
Alisma lanceolatum With.

Little used and under-managed canal, in still, shallow water, rooted in clay, PN med, base rich, alk, sun to ½ shade, with *Alism pla.*
Very rare: Canal at Blist's Hill. Also reported but not confirmed from R Clun near junction with R Teme. Formerly recorded from Walcot Pool. Recorded (but unconfirmed) in *ABF* from SJ 22, 32 and 51.

Starfruit
†Damasonium alisma Miller

Extinct.
Formerly recorded in *LFS* as 'abundant in Ellesmere Mere and adjoining ditches and canal' and from Ebury Wood.
Starfruit is thought to be on the verge of extinction now in Britain as a whole (see Chapter 9).

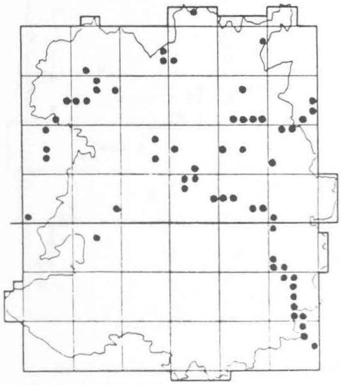
Arrowhead
Sagittaria sagittifolia L.



Margins of sluggish rivers, ditches and canals, in shallow water, rooted in mud, silt or clay, PN rich, base rich, neut to alk, sunny, sheltered. Apparently thermophilous and fairly tolerant of pollution. Ass: *Butom umb, Sparg ere, Rumex hyd, Potam nat, Nupha lut, Alism pla.*
A lowland species: locally frequent in E of region esp in R Severn and its tributaries.

FLOWERING-RUSH FAMILY BUTOMACEAE

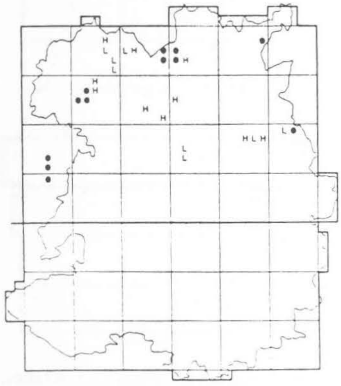
Flowering-rush
Butomus umbellatus L.



Canals and rivers with slow to mod flow, less commonly in lakes and ponds, in mod shallow water on mud or clay, PN med to rich, base med to rich, neut to alk, sunny, sheltered, intolerant of grazing. Generally as isolated individuals among more abundant reedswamp plants, but sometimes forming pure stands. Ass: *Glyce max, Sparg ere, Rumex hyd, Iris pse, Alism pla.*
Locally frequent in canals and rivers in lowlands esp Lower Severn Valley.

FROGBIT FAMILY HYDROCHARITACEAE

Frogbit
Hydrocharis morsus-ranae L.

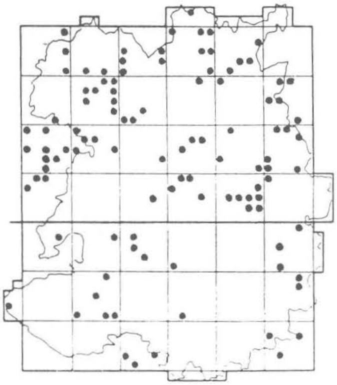


Disused reaches of canal and farm ponds in still mod shallow water, PN med to rich, base rich, neut to alk, sunny, sheltered. Often forming pure stands locally but a poor competitor with waterlilies and dense emergent plants. Ass: *Alism pla, Lemna pol, Lemna tri, Lemna min, Potam nat, Elode can, Hydro vul, Sparg ere.*
Local in Whixall area where it still grows in at least one farm pond; Aston Locks reach of canal: Pool Quay to Welshpool; scattered records elsewhere in lowland. Formerly recorded from many sites in N Shropshire plain. Decrease due to agricultural improvements.

Water-soldier
***Stratiotes aloides** L.

Introduced and well established in shallow pools at Merrington Green; at Hemford near Shelve; and at Bicton, Clun. One old record in *LFS* for Lilleshall Pond.

Canadian waterweed
***Elodea canadensis** Michx



Rivers with mod flow, canals, ditches, ponds and pools, in clear mod shallow water, rooted in mud or silt, PN med to rich, base med to rich, neut to alk, sun to ½ shade. A strong competitor often growing in pure stands. Ass: *Potam cri, Lemna tri, Cerat dem, Nupha lut, Potam nat.*
Frequent throughout lowland: local at lower altitudes in hill country.

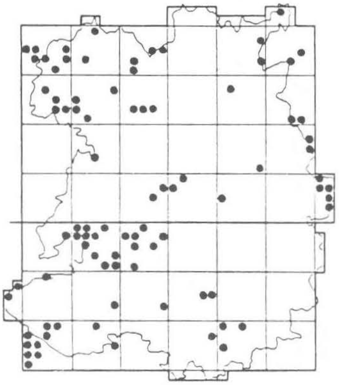
RANNOCH-RUSH FAMILY SCHEUCHZERIACEAE

Rannoch-rush
†Scheuchzeria palustris L.

Extinct.
Among sphagnum and sedges in the wettest parts of undrained acid peat bogs. Ass. *Carex las, Carex lim, Rhync alb, Drose rot, Narth oss, Spha cusp, Spha papi, Spha mage.*
Formerly known from several bogs near Shrewsbury and Ellesmere. First found in c1824 beside Bomere Pool by J Jeudwine (see 2.7), its second British station (Sledge 1949); last seen there c1881: found at Clarepool [Welshampton] Moss in 1866 by Fielden, last seen there in early 1870s: most recent record Ellesmere 1884 by Beckwith, searched for in vain by Linton in 1892.
Remains of rhizomes are frequent in peat bogs at base of upper undecayed layer of sphagnum.

ARROWGRASS FAMILY JUNCAGINACEAE

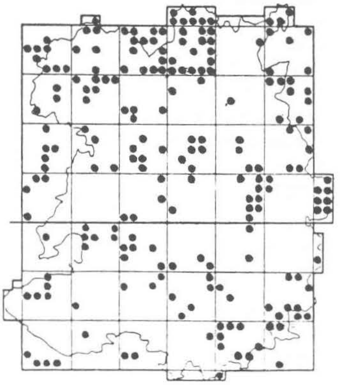
Marsh arrowgrass
Triglochin palustris L.



Species-rich wet meadows, fens and marshes, on moist to damp peat or loamy soils, PN poor to med, base med to rich, mod acid to calc, sunny, open. Apparently favoured by trampling and tolerant of mod grazing but not of ploughing, drainage or other land improvement. Ass: *Valer dio, Dacty fuc, Juncu art, Carex pcea, Carex pul, Anaga ten, Ranun fla.*
Locally frequent in Oswestry uplands; W Central hills; Clun Forest; and Clee hills: local to sparse in lowlands.

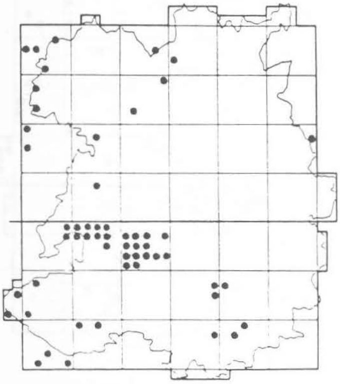
PONDWEED FAMILY POTAMOGETONACEAE

Broad-leaved pondweed
Potamogeton natans L.



Meres, pools, ponds, canals, ditches, in shallow to deep (2 or 3m) clear water, still to mod flow, rooted in mud or peat, PN med to rich, base med to rich, acid to alk, sun to ½ shade. A strong competitor sometimes forming pure stands of floating leaves. Ass: *Nupha lut, Lemna min, Elode can, Polyg amp.* Frequent throughout region in suitable habitats except at highest altitudes.

Bog pondweed
Potamogeton polygonifolius Pourret



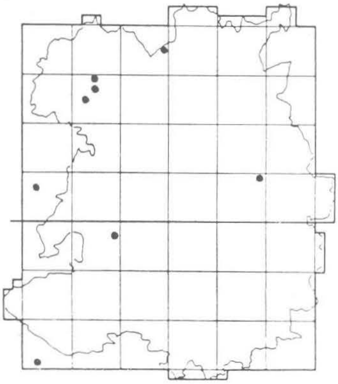
Peat pools and cuttings, acid hill streams and boggy ground, in shallow water or on bare peat or among mosses, wet to moist, PN poor, base poor, v. acid to acid, sunny. Tolerant of some trampling and grazing. The least aquatic of the pondweeds. Ass: *Narth oss, Eriop ang, Hyper elo, Spha cusp, Spha recu.*
Locally frequent in hill country of W and SW: sparse in N part of Shropshire plain.

Fen pondweed
†Potamogeton coloratus Hornem.
Exinct?
Recorded in *ABF* for SJ43 and in *HFS* from Ellesmere and ditch near Crose Mere.

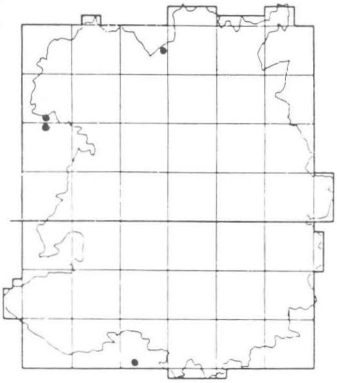
Shining pondweed
†Potamogeton lucens L.
Extinct?
Formerly recorded from the Berth Pool near Baschurch; Marton Pool near Chirbury; Oakly Park near Ludlow.

Various-leaved pondweed
Potamogeton gramineus L.
Not seen during current survey. Formerly recorded in *HFS* from a wet ditch near Cole Mere; White Mere; Blake Mere; canal at Upton Magna; Oss Mere; Berrington Pool. Shown in *ABF* from SJ 43 & 50.
The formerly rather frequent hybrid with **P. lucens, P. × zizii** Koch ex Roth, has been recorded from Crose Mere (1841 Borrer; 1892 Linton); Ellesmere (1884 Beckwith); Frankton (1885 Beckwith).

Red pondweed
Potamogeton alpinus Balbis
Canals, disused but with mod slow open water, rooted in mud or clay, PN med to rich, base rich, neut to alk, sunny. Mainly submerged but with occasional floating leaves, intolerant of disturbance and of tall emergent vegetation. Ass: *Potam pra, Potam com, Potam fri, Calli her, Luron nat, Elode can.*
Rare: Prees branch of Shropshire Union Canal, destroyed 1976; Aston Locks; Dawley; and Welshpool.
The hybrid with *P. praelongus* (**P. × griffithii** A. Benn.) has been recorded from the Prees branch (1973 CAS).

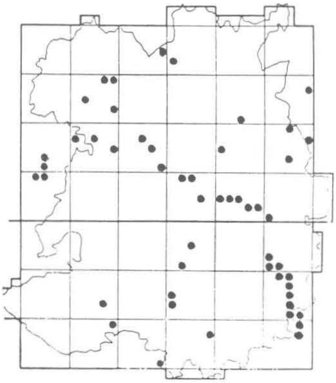


Long-stalked pondweed
Potamogeton praelongus Wulfen



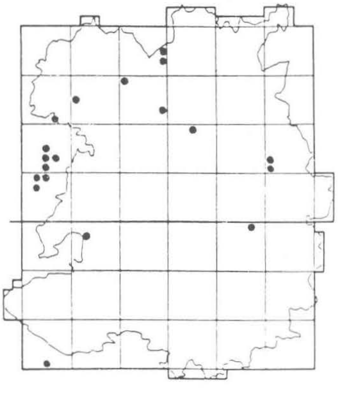
Canals, disused but with open water, rooted in mud or clay, PN med to rich, base rich, neut to alk, sunny. Ass: *Potam alp, Potam com, Potam fri, Calli her, Luron nat, Elode can.*
Rare: Prees branch of SUC; Montgomery branch just S of Llanymynech; also reported from R Teme near Leintwardine. Former records include canal near Shrewsbury (1881 Beckwith); SUC Ellesmere (1932 Vachell); Montgomery Canal (v c 47); Pool Quay, Welshpool etc (1940 JA Webb). Formerly also in navigated reaches of SUC but destroyed since early 1960s by modern maintenance methods.

Perfoliate pondweed
Potamogeton perfoliatus L.



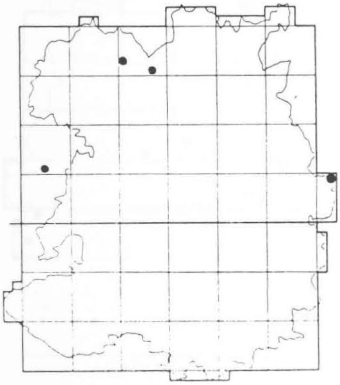
Rivers and canals, in still to swift-flowing water of mod depth, bottom rooted, often among stones, PN med to rich, base med to rich, neut to alk, sunny, v. resistant to damage in spate. Ass: *Ranun flu, Myrio spi, Potam cri.*
Abundant in R Severn below Bridgnorth: locally frequent from Ironbridge up to Welshpool: scattered lowland records elsewhere.
A possible hybrid with *P. crispus* has been reported from R Perry near Rednal Mill, but not confirmed (1983 CAS); This hybrid, **P. × cooperi** (Fryer) Fryer, has old records from Ellesmere 'in deep water' (1882 Beckwith); and from SUC at Upton Magna (1878 Scott).

Flat-stalked pondweed
Potamogeton friesii Rupr.



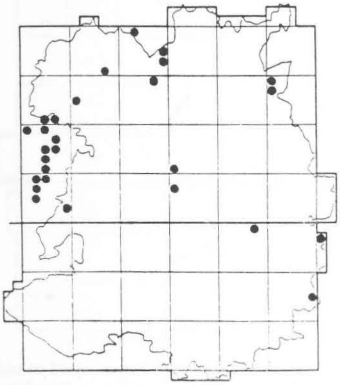
Disused reaches of canals and in lakes, in clear mod shallow water, rooted in bottom mud, PN med to rich, base rich, neut to alk, sunny. Ass: *Potam ber, Potam com, Potam obt, Ranun cir, Calli her.*
Locally frequent in disused reaches of Shropshire Union Canal esp between Llanymynech and Welshpool: also recorded from lake at Willey Park.

Lesser pondweed
Potamogeton pusillus L.
(*P. panormitanus* Biv.)



Rare: recorded from Whitemere N shore; R Roden near Loppington House; field pool near Weston Park; and canal at Pool Quay. One old record from Buildwas. Formerly not distinguished from *P. berchtoldii*.

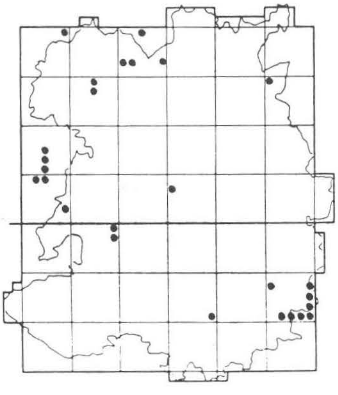
Blunt-leaved pondweed
Potamogeton obtusifolius Mert. & Koch



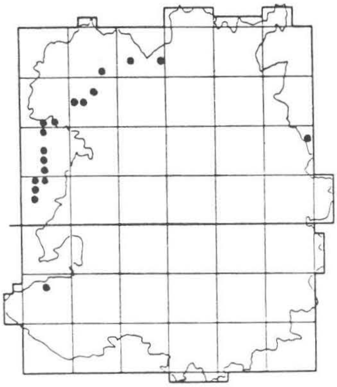
Ponds, pools, meres and disused reaches of canal, in mod deep, clear, still water, rooted in bottom mud or clay, PN rich, base rich, neut to alk, sun to ½ shade and often in pure stands. Ass: *Calli ham, Potam fri, Potam cri.*
Frequent in SUC between Llanymynech and Welshpool: scattered elsewhere in lowland parts of region.

Small pondweed
Potamogeton berchtoldii Fieber
(*P. pusillus* auct. mult., non L.)

Ponds, meres, slow streams and disused reaches of canal, in clear mod deep water, rooted in bottom mud, PN med to rich, base med to rich, neut to alk, sunny. Ass: *Potam cri, Potam com, Potam nat, Nupha lut, Lemna min, Elode can.*
Locally frequent in NW and SE of region: sparse elsewhere and mainly lowland.



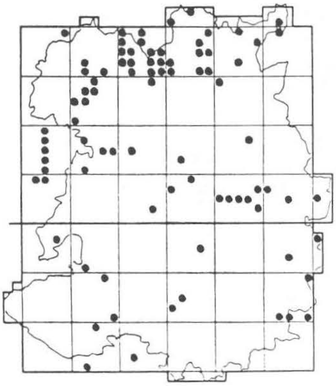
Grass-wrack pondweed
Potamogeton compressus L.



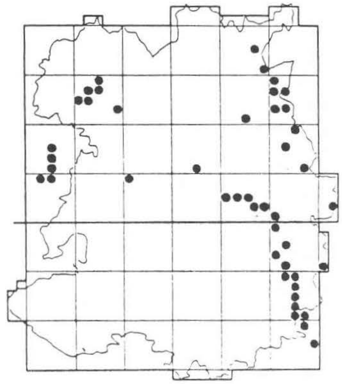
Disused reaches of canal, in clear mod deep water, often where the flow is somewhat swifter e.g. in aqueducts, PN rich, base rich, neut to alk, sunny. Ass: *Potam ber, Potam fri, Potam obt, Potam nat, Ranun cir, Calli obt, Elode can, Myrio spi.*
Frequent in Montgomery branch of Shropshire Union Canal. Formerly recorded from SUC Whixall (1936 Lousley). Recorded from Aqualate Mere in v c 39 (1925 Druce).

Curled pondweed
Potamogeton crispus L.

Rivers, slow streams, canals and ponds, in shallow to mod deep water, rooted among stones or in bottom mud or clay, PN rich, base med to rich, neut to alk, sun to ½ shade. Tolerant of intermittently strong current and of turbidity and some eutrophication. Ass: *Ranun flu, Calli sta, Apium nod, Potam per, Zanni pal.*
Locally frequent in N and NW parts of plain: local elsewhere in lowlands: rare in hill country.



Fennel pondweed
Potamogeton pectinatus L.



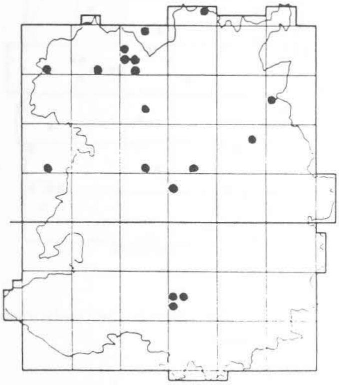
Rivers, streams, canals, ponds, in deep to shallow water, still to swift but usu mod flow, rooted in bottom mud, PN rich, base rich, alk, tolerant of turbidity and pollution. Ass: *Potam per, Potam nat, Myrio spi, Lemna tri, Zanni pal.*
One of the 3 species of submerged aquatics common in the R Severn downstream from Arley. Also frequent to locally abundant in navigated SUC in NE of region; open reaches of Montgomery canal. Early records in region are Welshpool (1874); Marton Pool, Chirbury (1898 Benson); and Ellesmere (1917 Wedgwood).

Opposite-leaved pondweed
†Groenlandia densa (L.) Fourr.

Extinct.
Recorded in *HFS* from Longnor and Marshbrook (presumably in Cound Brook and Quinny Brook, respectively). Both records are by G H Griffiths and are open to some doubt (see 2.11).

HORNED-PONDWEED FAMILY
ZANNICHELLIACEAE

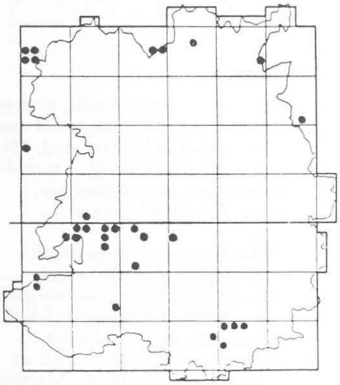
Horned pondweed
Zannichellia palustris L.



Small rivers, streams, meres, pools, ditches, disused reaches of canal, in still to mod swift, shallow to mod deep water, PN rich, base rich, neut to alk, sun to ½ shade. Tolerant of eutrophication and mod pollution. Almost the only submerged aquatic to survive in the most enriched meres. Ass: *Ranun flu, Calli sta, Lemna tri, Potam pec, Potam cri.*
Locally frequent and probably under-recorded in N plain: local in R Corve.

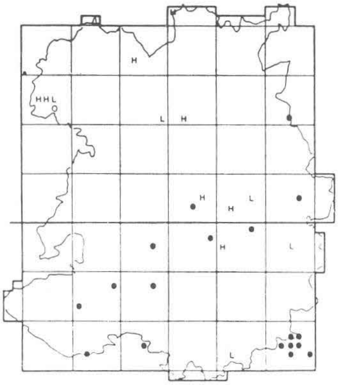
LILY FAMILY
LILIACEAE

Bog asphodel
Narthecium ossifragum (L.) Hudson



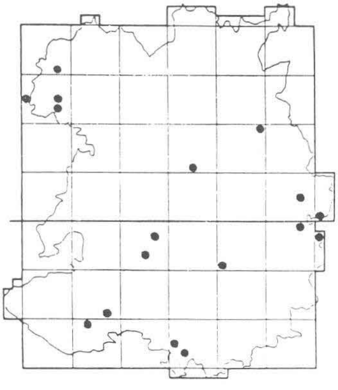
Wet patches in bogs, poor fens and flushes, on wet to moist, often peaty soil, PN poor, base poor, mod acid to acid, sunny, rather intolerant of grazing. An indicator of transitional areas in peat bogs and flushes where there is some water movement to replenish the nutrient supply. Ass: *Carex pul, Carex pcea, Carex ech, Erica tet, Eriop ang, Juncu bul.*
Locally frequent in Whixall area; Oswestry uplands; W Central hills; and Clee hill area: rare elsewhere.

Lily-of-the-valley
Convallaria majalis L.



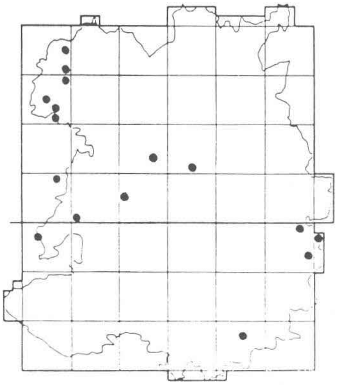
Open patches in old woods and mixed broad-leaved woodlands, on damp to dry soil, PN poor, base poor to rich, acid to neut, ½ shade to shade. Ass: *Dryop dil, Hyaci non, Holcu mol, Lonic per, Rubus fru, Vacci myr, Desch fle.*
Locally frequent in Wyre Forest: sparse elsewhere in S of region. Probably native in old woodland sites but naturalised elsewhere.

Solomon's-seal
Polygonatum multiflorum (L.) All.



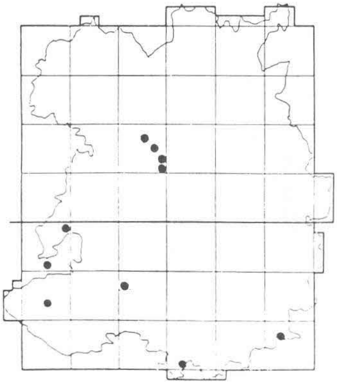
Open areas in old mixed woodland and shady hedgebanks, on damp to dry soils, PN poor to med, base med to rich, mod acid to calc, ½ shade to shade. Usu in limited quantity where it does occur.
Sparse at scattered localities in NW and S uplands: v. rare in plain. Possibly native in old woodland sites but more often naturalised.

Butcher's-broom
***Ruscus aculeatus** L.



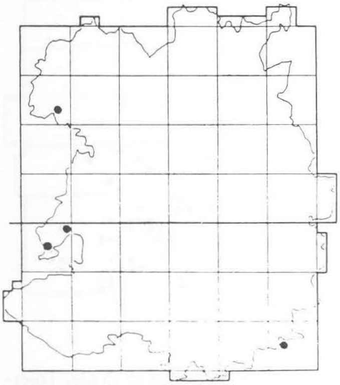
Edges of woods, open scrub, hedgebanks, derelict gardens, on damp to dry soils, PN poor to med, base med to rich, mod acid to calc, ½ shade to shade.
Local in NW and SE. Probably not native in any of its sites in this region.

Martagon lily, Turn-again-gentlemen
***Lilium martagon** L.



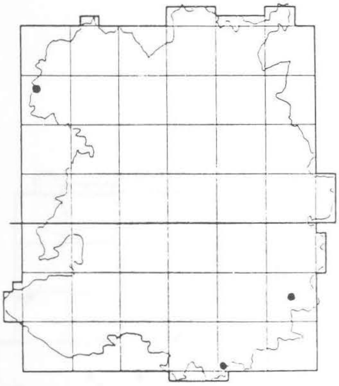
Naturalised and well established in old gardens, open scrub and woodland at several localities near Shrewsbury and in S of region.
The martagon lily is one of a number of ornamental monocotyledonous plants whose status as native or introduced species is particularly obscure; indeed, the distinction has little meaning in the case of plants which have been grown in gardens, and have spread freely from them, at least since the early Middle Ages. Lily-of-the-valley and stinking iris are probably native at most of their sites in the region; Solomon's-seal, snowdrop and wild daffodil locally native but more often introduced; butcher's-broom, martagon lily and star-of-Bethlehem native in other parts of Britain but not here. Fritillary is not known wild in Shropshire.

Pyrenean lily
***Lilium pyrenaicum** L.



Naturalised and well established in open scrub, woodland margins, hedgebanks and churchyards at Pen-y-coed, Llynclys Common; Middleton Churchyard, Priestweston; Whittery Wood, Chirbury; and churchyard at Far Forest (v c 37).

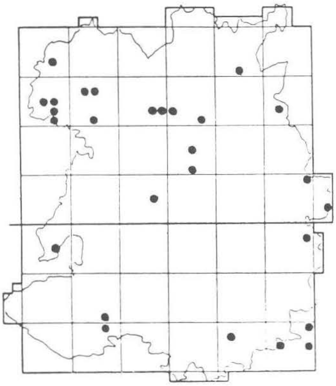
Yellow star-of-Bethlehem
Gagea lutea (L.) Ker-Gawler



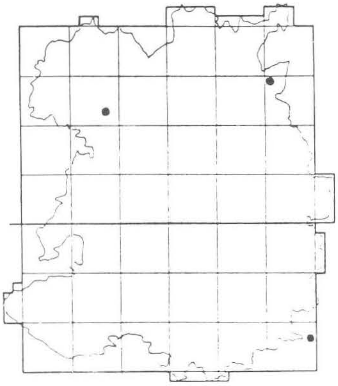
Dingles, wooded stream banks and rocky coppices, on moist to damp soil, PN poor to med, base rich, mod acid to calc, ½ shade, sheltered. Intolerant of trampling or grazing, seldom present in any quantity. Ass: *Hyaci non, Alliu urs, Adoxa mos, Anemo nem, Arum mac, Ranun fic.*
Rare: Pentre-gaer (1979 EDP); Corn Brook near Nash; and near Hampton.

Star-of-Bethlehem
'Betty (or John)-go-to-bed-at-noon', 'Nap-at-noon', 'Peep-o'-day'
***Ornithogalum umbellatum** L.

Well established on roadside verges and banks, rock outcrops, pastures, tracks and cottage gardens, on dry often shallow stony or loamy soils, PN poor to med, base med to rich, mod acid to calc, sunny, warm. Tolerant of light grazing or mowing and of compet with smaller grasses.
Naturalised alien found in scattered localities throughout region.



Drooping star-of-Bethlehem
***Ornithogalum nutans** L.

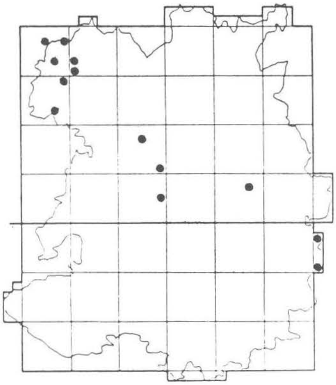


Garden escape naturalised on roadsides: Ruyton Towers; Goldstone Common; and near Bewdley.

Bluebell
Hyacinthoides non-scripta (L.) Chouard ex Rothm.
(*Endymion non-scriptus* (L.) Garcke)

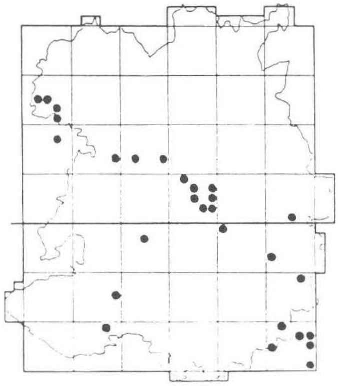
Open woodlands and plantations, scrub, bracken-covered hillsides, old under-grazed pasture, hedgebanks, verges and grassy heath, on dry to damp but well drained, usu deep loamy or sandy soils, PN poor to med, base poor to rich, acid to neut, sun to shade. Intolerant of heavy grazing or trampling and of compet with vigorous grasses, flooding or water-logging and deep shade.
Although generally regarded as a woodland plant, bluebell grows and flowers best in full sun e.g. woodland areas after felling or hillsides before bracken-cover is fully developed. Ass: *Holcu mol, Holcu lan, Stell hol, Silen dio, Orchi mas, Anemo nem, Primu vul, Mercu per.*
Abundant in suitable habitats throughout region.

Spanish bluebell
***Hyacinthoides hispanica** (Miller) Rothm.
(*Endymion hispanicus* (Miller) Chouard)



Naturalised and well established in old gardens, ornamental woodlands, coppices, hedgebanks and verges but always a garden escape.
Locally frequent in Oswestry area; and at a few places near Shrewsbury and Bridgnorth. First record in *RBF* 1923 at Meole Brace.
The hybrid *H. hispanica* × *non-scripta* is not uncommon where the parent species grow together.

Wild onion, Crow garlic
Allium vineale L.



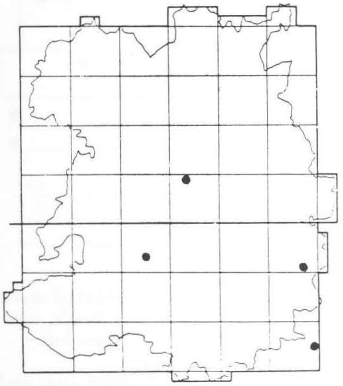
Grassy verges, hedgebanks, old rough pasture and rocks, on dry soils, PN poor to med, base med to rich, mod acid to calc, sunny, grazed or mown. An old pasture or meadow plant favoured by roadside verge management. Ass: *Knaut arv, Centa sca, Arrhe ela, Anthr syl.*

Locally frequent in Oswestry area (limestone); Shrewsbury to Cressage area and Lower Severn Valley: rare elsewhere in S and absent from much of N plain.

Field garlic
Allium oleraceum L.

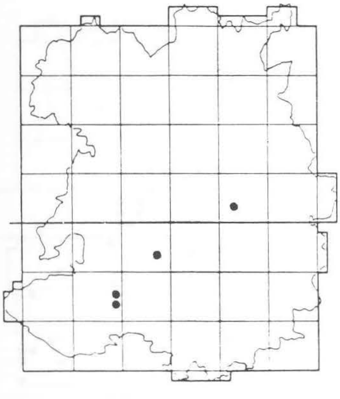
Recorded from Blakeway Hollow, Wenlock Edge (1978 MFC); and from footpath bank near High Grosvenor, Claverley (1979 WEH). Also recorded in *ABF* from SJ42 and 50: Cressage (1880 **SHY**).

Keeled garlic
***Allium carinatum** L.



Naturalised on roadsides and footpaths near Atcham Bridge; near Claverley; Church Stretton; and Bewdley.

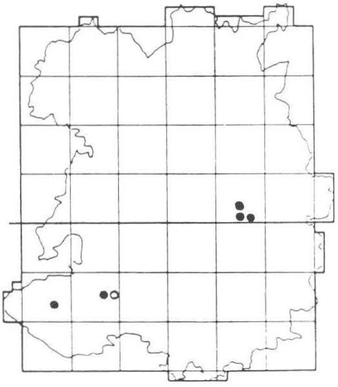
Three-cornered leek
***Allium triquetrum** L.



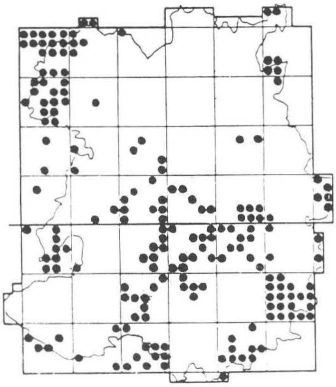
Naturalised and well established on banks and roadside verges at Tickwood Hall; Church Stretton; and Hopesay.

Few-flowered leek
***Allium paradoxum** (Bieb.) G. Don

Naturalised and well established on roadside verges, hedgebanks and field margins at or near Edgton; Posenhall; Hopesay; Whitcott Keysett; and Benthall Hall.



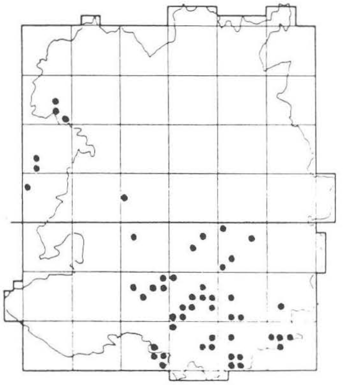
Ramsons
'Devil's-posy'
Allium ursinum L.



Dingles, old broad-leaved woodlands, scrub, stream and riverbanks, lane cuttings and hedgerows, on damp to moist clay or other heavy soils, sometimes over limestone, PN med to rich, base med to rich, mod acid to calc, ½ shade to shade. Intolerant of trampling but a successful competitor forming extensive pure stands, possibly by means of chemical warfare. In wooded ravines ramsons is characteristic of the nutrient-rich zone at the foot of slopes. Ass: *Mercu per, Desch cae, Carex rem, Primu vul, Ajuga rep, Anemo nem.*
Frequent in suitable habitats through most of region: rare or absent in parts of N plain and Clun Forest area.

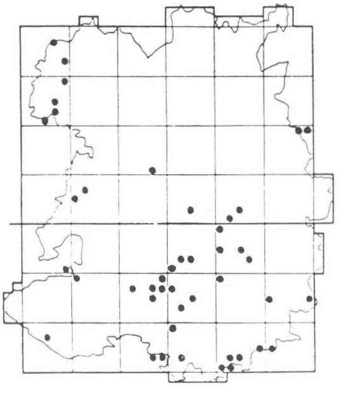
Meadow saffron, Autumn crocus
'Naked lady', 'Naked lads'
Colchicum autumnale L.

Old pastures and hayfields or under bracken, on dry to damp loamy or clay soil, PN poor to med, base med to rich, mod acid to neut, sun to shade. Tolerant of mod grazing but v. poisonous to stock unless dried in hay. Easily destroyed by ploughing and reseeding and thus only persists in unimproved pastures or where former pastures have been invaded by bracken and scrub. Ass: *Alche ves, Stach off, Rhina min, Primu ver, Dacty fuc, Hyaci non, Holcu lan.*
Sparse to locally frequent in Wenlock Edge; Clee hills platform area; and in NW uplands: absent from plain.



HERB-PARIS FAMILY
TRILLIACEAE

Herb-Paris
Paris quadrifolia L.

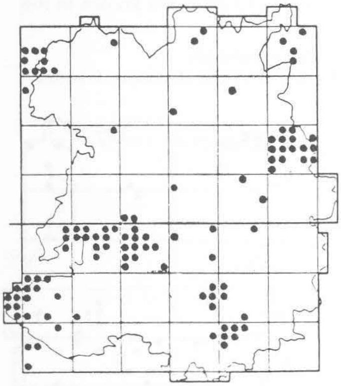


Ancient mixed broad-leaved woodlands, on damp clay or loamy soils, often over limestone, PN poor to med, base rich, mod acid to calc, shaded, sheltered, ungrazed. Sometimes forming pure stands but of limited area and never abundant. An indicator of long established woodland on base-rich clay soils. Ass: *Mercu per, Lamia gal, Sanic eur, Liste ova, Orchi mas, Anemo nem, Primu vul, Circa lut.*
Local in Oswestry uplands; Wenlock

Edge; Ludlow; Clee hills areas: rare elsewhere and absent from most of N plain and SW.

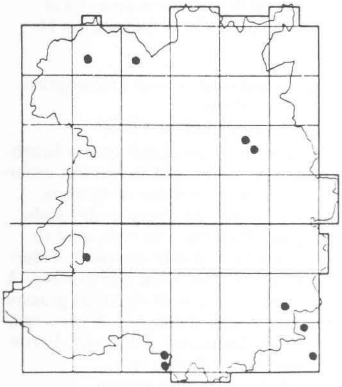
RUSH FAMILY
JUNCACEAE

Heath rush
Juncus squarrosus L.



Upland heath and moorland esp in more open grassy areas, on moist to damp peat or clay soils, PN poor, base poor, v. acid to acid, sunny, exposed. Favoured by heavy grazing and trampling but a poor competitor with taller species and often more abundant on trackways. Ass: *Nardu str, Galiu sax, Erica tet, Molin cae, Carex bin, Callu vul.*
Locally frequent in Oswestry uplands; W Central hills; Clee hills: sparse in N plain and Clun Forest.

Slender rush
***Juncus tenuis** Willd.



A recent introduction now well established in damp compacted soil by roadsides, canal towpaths, forest trackways, clay pits and quarries. Scattered localities in NW and S of region.
First recorded at Little Wenlock (1964 PHO) but site now destroyed.

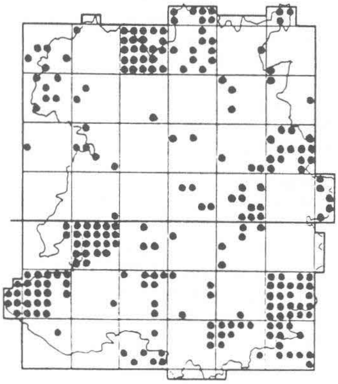
Round-fruited rush
$Juncus compressus Jacq.
Extinct in v c 40.
Reported but not confirmed from Burrington Common (v c 36); (1979 TEM). An old record for banks of the R Severn near Bridgnorth has not been refound.

Toad rush
Juncus bufonius L.
Damp tracks and woodland rides, gateways and rutted pastures, furrows at edges of arable fields, ditches, shallow ponds, on wet to damp, often winter-flooded but summer-dry soils with impeded drainage, PN poor to med, base poor, acid to mod acid, sun to ½ shade. Tolerant of trampling, disturbance and light grazing. A pioneer plant of bare mud, intolerant of compet in dense swards. Ass: *Gnaph uli, Juncu bul, Isole set, Agros can, Carex dem, Plant maj, Poa ann, Matri mat.*
Frequent in suitable habitats throughout region esp uplands.
The segregates of this species have not been distinguished in this survey.

Hard rush
Juncus inflexus L.
Banks of rivers, streams, ditches, canals, ponds, wet hollows in fields, quarry floors, building sites and waste ground, on wet to damp winter-flooded or water-logged clay soils, often in association with limestone, PN poor to rich, base med to rich, mod acid to calc, sunny. Tolerant of trampling and disturbance, avoided by grazing animals. The commonest rush on wet base-rich soils usu indicating some lateral movement of the ground water. Ass: *Agros sto, Alope gen, Carex hir, Briza med, Leont aut, Ranun acr, Prune vul.*
Abundant in suitable habitats throughout region.

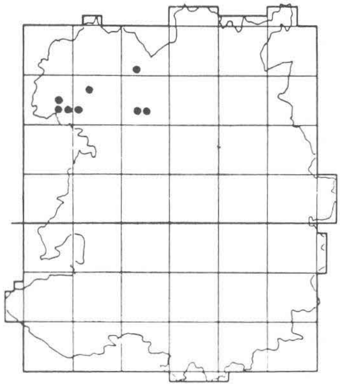
Soft rush
Juncus effusus L.
Banks of rivers, streams, lakes, ponds, ditches, canals, wet hollows in pasture, flushes, springs and damp valleys in moorland, sometimes in shallow standing water but usu on wet to damp, often winter-flooded soils with variable water-table and some movement of ground water, PN poor to med, base poor to med, v. acid to mod acid, sun to ½ shade. Tolerant of trampling and disturbance but generally avoided by grazing animals and poisonous in quantity, often forming extensive stands or clumps in poorly drained pastures. The high flood level of some pools is marked by a distinct zone of soft rush where floating seeds have stranded and germinated. Ass: *Desch cae, Molin cae, Holcu lan, Agros can, Carex ova, Carex nig, Juncu con, Hydro vul, Ranun rep, Calth pal, Filip ulm.*
Abundant throughout region.

Compact rush
Juncus conglomeratus L.



Moorland, wet heath, banks of streams, ponds, hollow in grassland, fen and bog, on wet to damp winter-wet, often peaty soils with impeded drainage, PN poor, base poor, sunny, exposed. Tolerant of trampling and avoided by grazing animals, sometimes forming large clumps, less common than soft rush generally, but locally abundant on more acid nutrient-poor soils esp in uplands. Ass: *Molin cae, Eriop vag, Nardu str, Carex nig, Erica tet, Galiu sax.*
Locally frequent in Ellesmere – Whitchurch area; W Central hills; Clee hills; and Lower Severn Valley: probably under-recorded elsewhere but sparse in limestone areas and parts of N plain.

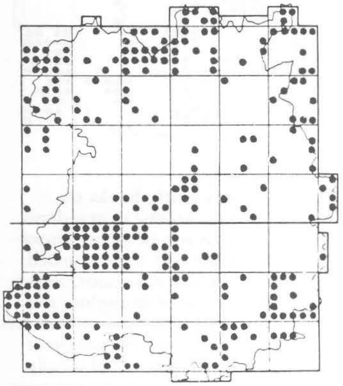
Blunt-flowered rush
Juncus subnodulosus Schrank



Calcareous fens, flushes and rich meadows, usu on peaty soils, associated with limestone, wet to damp with mobile ground water, PN poor to med,

base rich, mod acid to calc, sunny. Tolerant of trampling, mowing or light grazing and a strong competitor with tall grasses but eliminated by heavy grazing, drainage or the frequent application of fertilisers. An uncommon but v. characteristic species of this particular habitat. Ass: *Carex amis, Carex pcea, Carex fla, Carex lep, Valer dio, Trigl pal, Epipa pal, Crepi pal.*
V. local in Oswestry area; also by Crose Mere and Fenemere.

Sharp-flowered rush
Juncus acutiflorus Ehrh. ex Hofm.

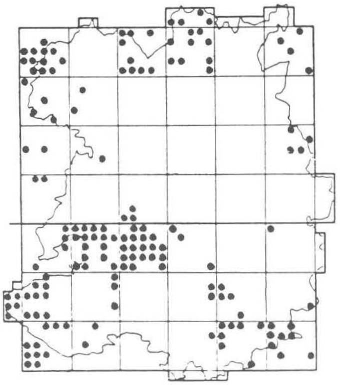


Wet grassland, marshes, tall fen and moorland flushes, on moist to wet loam, clay or peat with mobile ground water and variable water-table, PN med, base med, acid to mod acid, sun to ½ shade, cool. Tolerant of intermittent mowing and v. light grazing. A strong competitor, sometimes forming dense stands. Ass: *Lotus uli, Holcu lan, Succi pra, Galiu pal, Molin cae, Angel syl.*
Frequent in upland areas and in Ellesmere – Whitchurch area: rather sparse in lowlands.
The hybrid with *J. articulatus* is commonly found where the parent species meet and may be more abundant locally than one or other parent.

Jointed rush
Juncus articulatus L.

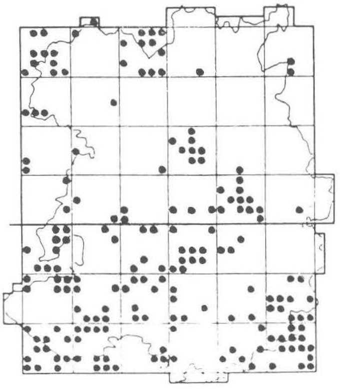
Flushes, runnels, stream sides, ditches, fens, marshes, edges of ponds and canals, wet hollows in fields, on wet to damp soils, waterlogged or with variable water-table and mobile ground water, PN poor to med, base med to rich, acid to calc, sunny. Tolerant of trampling, grazing and mowing, adopting a more prostrate habit when grazed and a more upright one in taller vegetation. Ass: *Ranun fla, Agros sto, Carex fla, Prune vul, Lychn flo, Calth pal, Holcu lan.*
The commonest rush of the short sward in wet grassland.
Frequent throughout region.

Bulbous rush
Juncus bulbosus L.



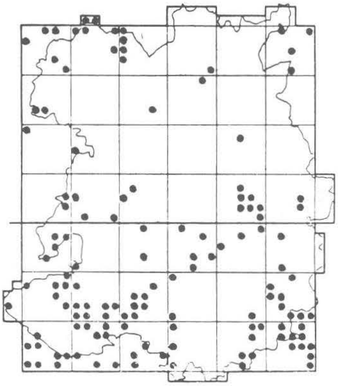
On wet bare or trampled patches in grassland, peat bogs, heathland, ditches, runnels and ponds, in rutted tracks or in shallow standing water, on wet to damp, intermittently flooded, often peaty soils, PN poor, base poor, v. acid to mod acid, sun to ½ shade. Tolerant of trampling and light grazing, a common pioneer of bare ground or recently dug drains, but a poor competitor in dense vegetation. A distinct form with long stolons and fine hair-like leaves (var. **'fluitans'**), occurs in acid pools and ditches. Ass: *Juncu buf, Carex dem, Isole set, Agros can, Carex nig,* (in water with *Elog flu, Apium inu*).
Locally frequent in Ellesmere–Whitchurch area; Oswestry uplands; W Central hills; Clun Forest; Clee hills; and Wyre Forest: sparse to absent elsewhere. **J. kochii** Schultz has not been distinguished in the present survey: *FPW* shows records for SO39 and SJ21, both in v c 47.

Hairy wood-rush
Luzula pilosa (L.) Willd.



Broad-leaved woodlands and shady banks, often in dingles, valleys or near streams, on dry to moist soils, PN med, acid to neut, ½ shade to shade, cool, ungrazed. Ass: *Lathy mon, Solid vir, Vacci myr, Desch fle, Hyper pul, Dryop, dil, Oxali ace.*
Locally frequent in Ellesmere area; Oswestry uplands; SW hills; and Wyre Forest area.
The hybrid with *L. forsteri* (Sm.) DC (**L × borreri** Bromf, ex Bab.) is shown in *CSABF* for SO47 and 77, although *L. forsteri* itself is not known in this region.

Great wood-rush
Luzula sylvatica (Hudson) Gaudin



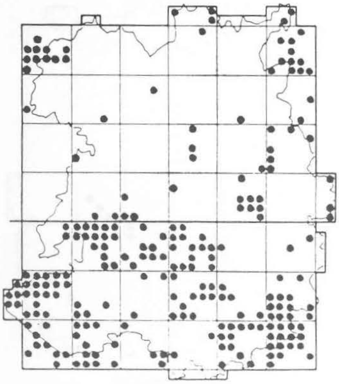
Broad-leaved woodlands esp sessile oak and on open moorland slopes facing N, on deep loamy acid soils with thick raw humus layer, damp to moist, PN poor, base poor, acid to v. acid, shade to ½ shade. Intolerant of trampling, grazing and drought. Single plants often spread to form long clonal patches. Ass: *Melam pra, Vacci myr, Desch fle, Blech spi, Callu vul.*
Locally frequent in NW Clun Forest area; and Wyre Forest area: local elsewhere in hills and sparse on N plain.

Field wood-rush, Good-Friday-grass 'Sweep's-brushes'
Luzula campestris (L.) DC.

Poor pasture, moorland, grassy heathland, rock banks, old mown but unfertilised lawns (esp those of families without dogs), on damp to dry soils, PN poor, base poor to rich, acid to neut, sun to ½ shade, exposed. Tolerant of heavy trampling and grazing. A poor competitor with vigorous grasses. Ass: *Agros cap, Festu ovi, Hypoc rad, Plant lan, Lotus cor, Trifo rep, Veron ser, Cynos cri, Antho odo.*
Frequent throughout region.

Heath wood-rush
Luzula multiflora (Retz.) Lej.

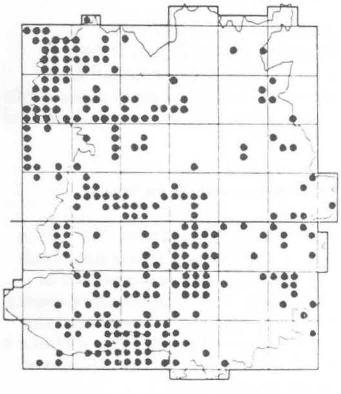
Grassy moorland, poor fen, open birch wood and scrub, on moist to damp peat or loam with impeded drainage, PN poor, base poor to med, acid to mod acid, sun to ½ shade. Fairly tolerant of grazing and trampling but



not of compet with tall grasses. Ass: *Succi pra, Galiu sax, Nardu str, Molin cae, Poten ere, Eriop ang, Erica tet.*
Locally frequent in Oswestry uplands; S. hill country; and Wyre Forest area.

DAFFODIL FAMILY
AMARYLLIDACEAE

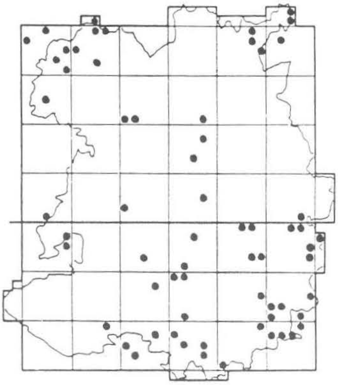
Snowdrop
Galanthus nivalis L.



Well established in open woodlands, scrub, old orchards, hedgerows and wild gardens, usu in damp loamy soils, PN med to rich, base med, mod acid to neut, ½ shade to shade, sheltered, gregarious and often abundant where it occurs. Usu, perhaps always, an escape from cultivation in this region though often remote from present day habitations. Ass: *Primu vul, Ajuga rep, Alliu urs, Mercu per, Adox mos, Veron mon.*
Frequent in W and SW of region: sparse to locally frequent in E.

Wild daffodil
'Daffodowndilly', 'Sweet Nancy'
Narcissus pseudonarcissus L.

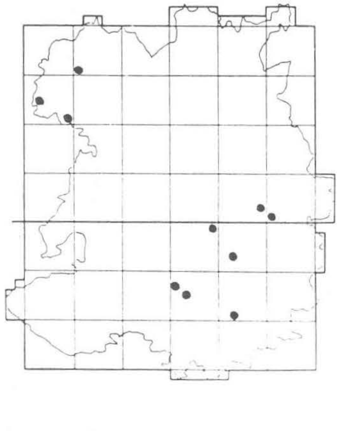
Old pastures, meadows, churchyards, orchards and edges of open woodland, on damp but well drained loamy soils, PN med, base med to rich, mod acid to calc, sun to ½ shade. Tolerant of trampling and grazing (avoided by livestock), but not of compet with taller grasses. Ass: *Primu ver, Anemo nem, Hyaci non, Cynos cri, Antho odo, Agros cap.*
Surprisingly rare in this region and perhaps native only in the SE. Decrease in range due mainly to ploughing and reseeding, but widely planted, often in mixtures with other *Narcissus* varieties.



IRIS FAMILY
IRIDACEAE

Blue-eyed-grass
$†*Sisyrinchium montanum E.L. Greene
(Recorded as *S. bermudiana* L.)
Extinct? Not in v c 40.
Formerly recorded as naturalised on limestone quarry floor at Llanymynech Rocks Nature Reserve just on Welsh side of border, but not seen for several years.

Stinking iris, Roast-beef-plant, Gladdon
Iris foetidissima L.

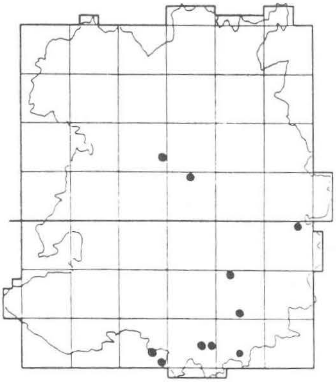


Open woodlands and scrub on limestone and roadside banks, trackways and field margins, on dry shallow stony soils, PN poor to med, base rich, mod acid to calc, sun to ½ shade, warm, ungrazed. Ass: *Campa tra, Origa vul, Mercu per, Hyper hir, Brach syl.*
Probably native in limestone woodland sites (e.g. Craig Sychtyn STNC Reserve and Wenlock Edge), but almost certainly a garden escape elsewhere. Appears to have increased since 1913: in *HFS* only for Sharpstones; Shelton Rough; Marrington; and Shortwood near Ludlow.

Yellow iris, Yellow flag
'Legs'
Iris pseudacorus L.

Ponds, ditches, canal banks, fens, wet hollows in fields, in shallow water or on wet winter-flooded mud or clay, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered. Tolerant of trampling and light grazing, often forming extensive stands at edge of water. Ass: *Typha lat, Sparg ere, Carex amis, Epilo hir, Filip ulm.*
Frequent in suitable habitats throughout region.

Autumn crocus
***Crocus nudiflorus** Sm.



Naturalised in old pastures and meadows. Long known in Shrewsbury from the part of Mountfields nearest (across the river) to Coton Hill; and formerly from 'The Quarry'. Also recorded from Attingham Park and a number of sites near Ludlow; Knowbury; Oreton; Neenton; Badger.

Spring crocus
***Crocus vernus** (L.) Hill

Occasionally naturalised on roadsides and field edges, but seldom persistent. Recent records are from Hopton Castle; Purlogue (1977 JR); and from Hope Bagot (1981 PHW).

YAM FAMILY
DIOSCOREACEAE

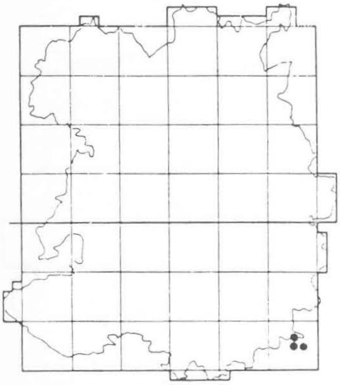
Black bryony
Tamus communis L.

Hedgerows, margins of woodland and scrub on damp to dry soils, PN med to rich, base rich, mod acid to calc, sunny, warm, sheltered, ungrazed, scrambling through hedges or bushes to reach light. Ass: *Bryon dio, Rosa arv, Lonic per, Galiu apa, Cornu san, Prunu spi.*
Frequent in lowland hedges; more local in upland: absent at highest altitudes.

ORCHID FAMILY
ORCHIDACEAE

White helleborine
†Cephalanthera damasonium (Miller) Druce
Extinct?
Recorded once by S E Chandler in August 1940 for Wenlock Edge, on summit between Eaton and Westhope, one plant only. Not previously recorded in v c 40, nor seen since.

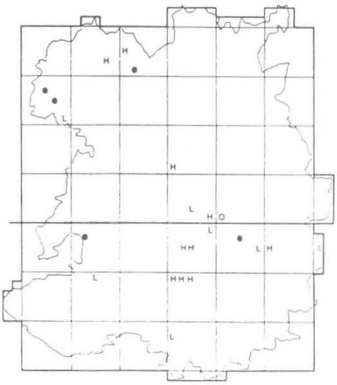
Narrow-leaved helleborine
$Cephalanthera longifolia (L.) Fritsch



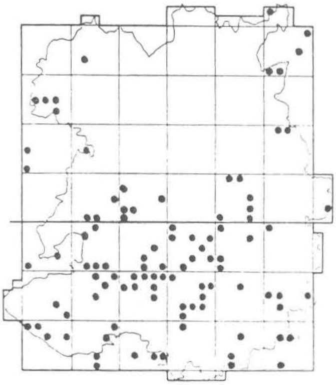
Extinct in v c 40?
All recent records are in the Worcs (v c 37) half of Wyre Forest made by JB, MCC and FF from 1974–79. There are earlier records for Craven Arms and Ruckley as well as Wyre Forest.

Marsh helleborine
Epipactis palustris (L.) Crantz

Calcareous fens and flushes, on wet to moist clay or peat, PN poor, base rich, neut to calc, sun to ½ shade, sheltered. Favoured by trampling and tolerant of light grazing, persisting in closed communities of med sized sedges but not tall fen. Ass: *Valer dio, Juncu sub, Sagin nod, Carex lep, Eriop lat, Crepi pal.*
Rare: Oswestry uplands (limestone); near Crose Mere; Shirlett; near Shelve. Formerly recorded from several localities in Ellesmere area; Much Wenlock area; Wenlock Edge; Ludlow; and Bridgnorth. V. much decreased through drainage and agricultural improvement.

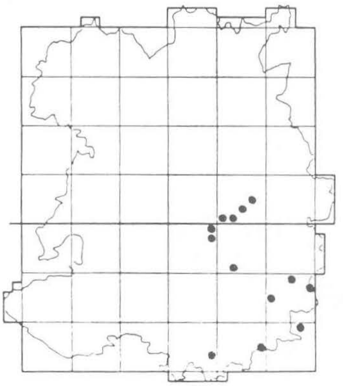


Broad-leaved helleborine
Epipactis helleborine (L.) Crantz



Edges, rides and clearings of old broad-leaved woodlands, scrub and shady hedgebanks, esp on lime-rich clay, damp to dry, PN med, base med to rich, mod acid to calc, shade to ½ shade, sheltered, ungrazed. A poor competitor but often locally frequent in bare places in woods. Ass: *Circa lut, Sanic eur, Paris qua, Mycel mur, Carex syl, Liste ova.*
Locally frequent in Wenlock Edge–Church Stretton area; and on parts of Clee hills platform: local in SW; Oswestry uplands; and extreme NE: rare elsewhere.

Violet helleborine
Epipactis purpurata Sm.
(*E. sessilifolia* Peterm.)
Old woods, shady verges and wild gardens, on damp to dry base-rich soils, usu over limestone, PN poor to med, base med to rich, mod acid to calc. Local in Much Wenlock area and sparse in SE of region but perhaps slowly increasing.



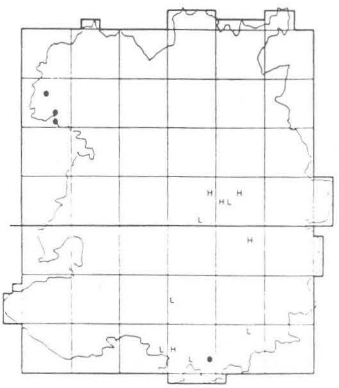
It is recorded in *Topographical Botany* Edn II (1883) by H.C. Watson with the comment "Babington MS", but not mentioned in either *LFS* or *HFS*. Refound at Benthall Hall in the early 1960s by Sir Paul Benthall.

Narrow-lipped helleborine
Epipactis leptochila (Godfery) Godfery
V. rare: with *E. purpurata* in a wood on Wenlock Edge (1978 EAA). Mentioned by Lloyd (1940) for two unspecified sites in v c 40.

Green-flowered helleborine
Epipactis phyllanthes G.E. Sm.
V. rare: recorded in Benthall Edge Wood by Sir Paul Benthall in the 1960s and seen in subsequent years in several sites there.

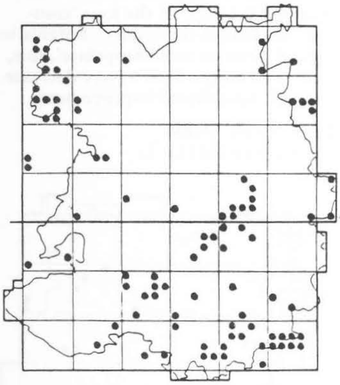
Ghost orchid
†Epipogium aphyllum Swartz
Extinct.
Found three times (1876, '78, '92) in part of Bringewood Chase near Ludlow when the area was still part of Shropshire. The administrative county boundary has since changed and the site now lies in Herefs but is still in v c 40. Recent records in that area have not been confirmed.

Autumn lady's-tresses
Spiranthes spiralis (L.) Chevall.



Grassy slopes, tracks, roadside verges, lawns, on dry usu shallow soils over limestone, PN poor, base rich, neut to calc, sunny. Favoured by heavy grazing and trampling or frequent mowing and also apparently by disturbance of the ground. It is one of the first orchids to appear in recently sown turf over limestone.
Rare: Llynclys–Llanymynech area; and The Novers. Formerly recorded from several sites in Buildwas – Ludlow area. Apparent severe decrease, but perhaps short-lived and not persistent in our area.

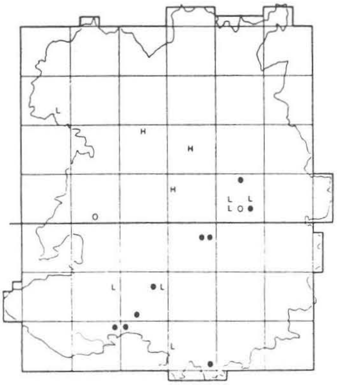
Common twayblade
Listera ovata (L.) R. Br.



Old broad-leaved woodland esp clearings and rides, and unimproved herb-rich pastures or meadows, on damp loam or clay, often over limestone, PN med, base med to rich, mod acid to calc, sun to shade, tolerant of occasional grazing. Ass: Woodland – *Orchi mas, Mercu per, Hyaci non, Ajuga rep;* Grassland – *Rhina min, Primu ver, Plant lan, Ajuga rep, Prune vul, Dacty fuc.*
Frequent in Oswestry uplands; Wenlock Edge and SE: sparse elsewhere and absent from acid parts of hill country and most of N plain.

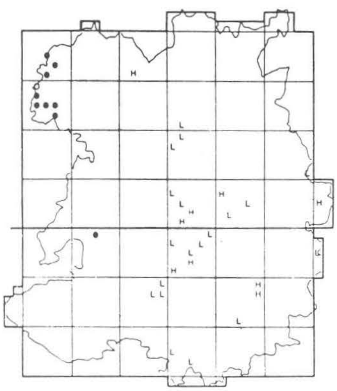
Lesser twayblade
†Listera cordata (L.) R.Br.
Extinct.
The first Shropshire record for this species was by Littleton Brown in 1726 "on ye top of ye Stiperstones". *LFS* places it more precisely "among the heath on the E side of the Stiperstones Hill immediately below the Devil's Arm-Chair." Thompson and Benson write in *HFS* "not found here since, although looked for." It has also been reported from the N end of the Long Mynd plateau and from Selattyn Hill; the most recent record is from Welshampton in *RBF* 1920. It still grows in some quantity a few miles W of the region on the Berwyn Mts (v c 47/48 boundary), and could perhaps reappear in Shropshire, but fires and the increase in public pressure have made the upland heaths less suitable for it.

Bird's-nest orchid
Neottia nidus-avis (L.) L.C.M. Richard



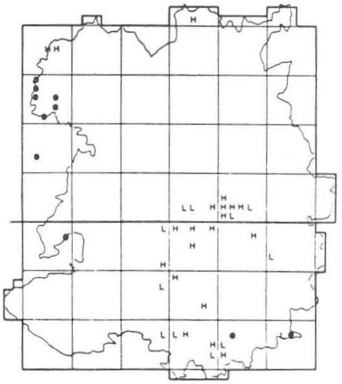
Old limestone woodlands, scrub, limestone quarries, on damp to dry, often shallow soils, PN poor, base rich, neut to calc, shade to ½ shade, sheltered, ungrazed. Ass: *Mercu per, Sanic eur, Carex fla, Centa ery, Dacty fuc, Plata chl.*
Sparsely scattered along limestone outcrop from Ironbridge to Stokesay. Formerly known from a number of localities elsewhere in county. Marked decrease.

Frog orchid
Coeloglossum viride (L.) Hartman



Old species-rich pastures, open scrub, abandoned quarries, tracksides, usu on limestone, on damp to dry, often shallow soils, PN poor, base rich, mod acid to calc, sunny. V. tolerant of grazing and trampling, but a poor competitor with tall grasses. Ass: *Dacty fuc, Anaca pyr, Linum cat, Briza med, Black per, Clino vul.* V. Local in Oswestry uplands (limestone); and in one old croft at Pennerley on the Stiperstones.
Formerly known from many localities in Central and SE Shropshire esp Wenlock Edge. Severe decrease.

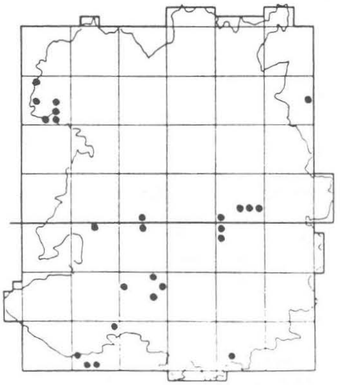
Fragrant orchid
Gymnadenia conopsea (L.) R.Br.



Old species-rich pastures, calcareous meadows and fens, on moist to dry, often winter-wet clay or loam soils, PN poor to med, base rich, neut to calc, sunny, sheltered. Tolerant of light grazing and favoured by mowing, but a poor competitor with tall grasses. Ass: dry – *Anaca pyr, Coelo vir, Black per, Plata chl, Carex fla, Briza med;* wet– *Epipa pal, Dacty fuc, Crepi pal, Carex pcea, Carex fla, Briza med, Valer dio.* Ssp. **conopsea** is typical of drier limestone pastures, ssp. **densiflora** (Wahlenb.) G. Camus, Bergon & A. Camus of fens and wet meadows. The interesting hybrid *Coeloglossum viride* × *Gymadenia conopsea* (× **Gymnaglossum jacksonii** (Quirk) Rolfe) was recorded near Cressage in 1912 and near Longnor in 1922.

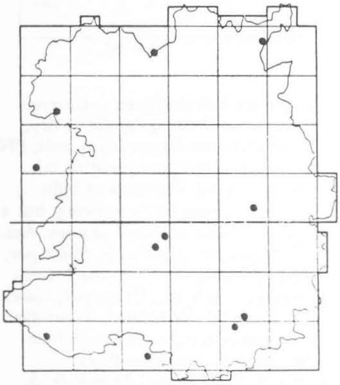
Small-white orchid
†Pseudorchis albida (L.) A. & D. Löve
One v. old and rather doubtful record from Benthall Edge.

Greater butterfly-orchid
Platanthera chlorantha (Custer) Reichenb.



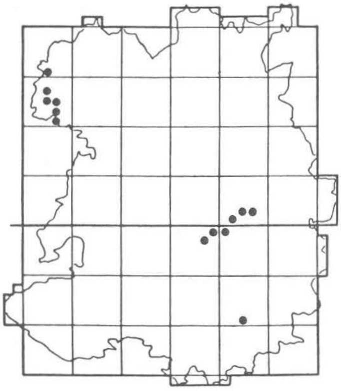
Old species-rich grassland and limestone quarries, open scrub and woodland margins, on damp to dry, often winter-wet, shallow soils, PN poor, base rich, neut to calc, sun to ½ shade. Tolerant of light grazing but often in bare patches where compet with tall grasses is reduced. More calcicole than *P. bifolia* in this region. Ass: *Liste ova, Orchi mas, Genti ama, Black per, Leont his, Briza med, Carex fla, Anaca pyr.*
V. locally frequent in Oswestry uplands (limestone); and Wenlock Edge area: rare elsewhere in S and absent from N lowlands.

Lesser butterfly-orchid
Platanthera bifolia (L.) L.C.M. Richard



Species-rich grassland, meadows and fen, on moist to damp loam, clay or peaty soils, often with impeded drainage or variable water-table, PN poor, base poor to rich, acid to neut, sun to ½ shade. Tolerant of light grazing or annual mowing for hay. Ass: grassland – *Plata chl, Orchi mas, Primu ver, Briza med;* fen – *Molin cae, Carex pcea, Dacty inc, Narth oss.*
Sparse: scattered localities near Oswestry; Wem; Market Drayton; Ironbridge; Church Stretton; Silvington; Knighton; and Leintwardine.

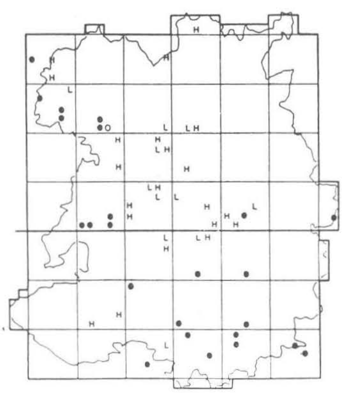
Bee orchid
Ophrys apifera Hudson
Limestone quarries, spoil heaps and bare patches in grassland, on damp to dry, often winter-wet, shallow soils, sometimes v. stony, PN poor, base rich, calc, sunny, warm, open. Tolerant of heavy grazing and trampling. Typically a plant of open communities and a poor competitor. One of the few orchids to colonise man-made habitats (see also *Spiranthes*). Ass: *Genti ama, Briza med, Black per, Leont tar, Centa ery, Carex fla.*
Local in Oswestry uplands and Much Wenlock area with an outlying record at Farlow.
The **wasp orchid, O. apifera** var. **trollii** Hegetschw., has been recently recorded and confirmed from quarries near Much Wenlock (1978 MEC and 1979 BRF).



Fly orchid
†Ophrys insectifera L.
Probably extinct.
Formerly known from several sites in a limited area near Much Wenlock, the last record apparently being in *RBF* 1941, when "three plants appeared in bloom in the old habitat near Wyke, despite a dense growth of dog's mercury."

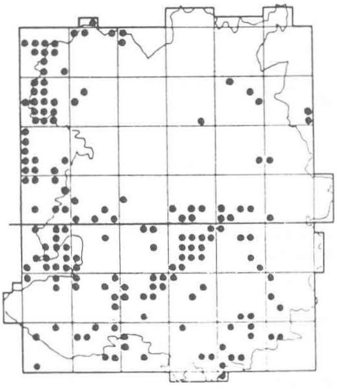
Burnt orchid
†Orchis ustulata L.
Extinct.
A plant of grazed limestone grassland. Formerly recorded from several fields under the Wenlock Edge near Harley and Rowley; the field at Rowley was drained in 1904. Also at Upper Millichope; the Woodlands near Bridgnorth; The Lodge, Ludlow; and from Downton Gorge opposite the Castle. There seem to have been no records during the present century.

Green-winged orchid
Orchis morio L.



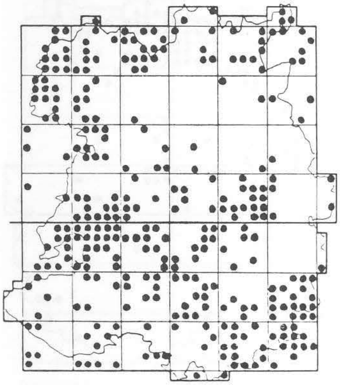
Old species-rich pastures and hay meadows, on damp to dry, often winter-wet sandy or loamy soils and on limestone, PN poor, base med to rich, mod acid to calc, sunny, warm, sheltered. Tolerant of light grazing and of summer mowing for hay. Solitary but occasionally in some abundance. Ass: *Danth dec, Poten ere, Rhina min, Succi pra, Holcu lan, Festu pra, Antho odo, Ophio vul, Botry lun.*
Typical of old grassland in both lowlands and uplands on impoverished but not lime-deficient soils.
Now known only from a few localities in Llynclys area; Kinnerley; Bentlawnt; Snailbeach area; Benthall; Shipton; Hayton's Bent; Knowbury; Chetton; Albrighton; and Wyre Forest. Formerly much more widespread in mid Shropshire: even as late as 1940 Lloyd regarded it as one of the four 'common' orchids of the county, 'notably in upland pastures in S Shropshire', this, alas, is no longer true. Severe decrease through agricultural improvements.

Early-purple orchid
Orchis mascula (L.) L.



Old woodland, open scrub, grassy banks, verges and meadows, on damp but well drained loams and clays, commonest on limestone but not confined to it, PN poor to med, base med to rich, mod acid to calc, sun to shade, sheltered. Tolerant of light grazing and trampling, a poor competitor with vigorous grasses, solitary but often locally abundant. Ass: *Primu vul, Primu ver, Sanic eur, Anemo nem, Hyaci non, Ajuga rep, Lamia gal.*
Frequent in Oswestry uplands and Wenlock Edge area: locally frequent elsewhere in S and SW of region: sparse in NE.

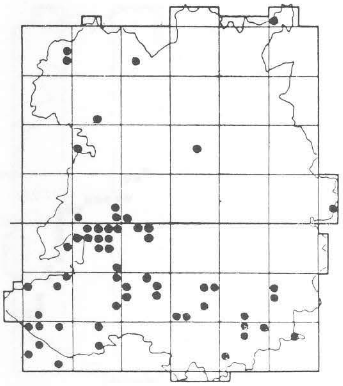
Common spotted-orchid
Dactylorhiza fuchsii (Druce) Soó
Unimproved species-rich grassland, open woodland and scrub, quarry floors, fens and marshes, on damp to intermittently moist, often poorly drained loam or clay soils or on peat, PN med, base med to rich, mod acid to calc, sun to ½ shade, sheltered. Tolerant of light grazing or occasional



mowing, persists in compet with mod vigorous grasses, growing to c0.5m. Sometimes forming large and conspicuous colonies in former quarries and claypits. Ass: *Ranun acr, Lotus uli, Lathy pra, Primu ver, Rhina min, Liste ova, Juncu acu, Antho odo.*
Frequent throughout S and W of region esp on lime-rich soils: locally frequent in N (Ellesmere and Market Drayton): sparse elsewhere and absent from intensive arable lowland.
Like other species in this difficult genus, *D. fuchsii* is v. variable and hybridises esp with *D. praetermissa.*

Heath spotted-orchid

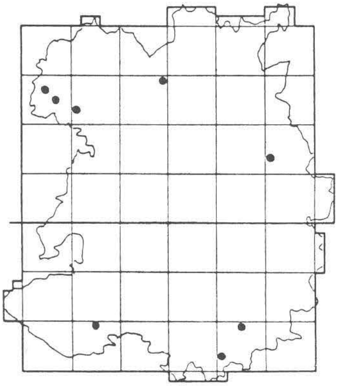
Dactylorhiza maculata (L.) Soó
(ssp. **ericetorum** (Linton) P.F. Hunt & Summerhayes.
(*Orchis ericetorum* Linton)



Valley mires, flushes, moorland edges, poor pasture, meadows and boggy ground, on moist to damp, poorly drained, often peaty soils, usu with seeping ground water, PN poor, base poor to med, acid to mod acid, sunny. Tolerant of grazing or occasional mowing and possibly favoured by trampling. Commoner in the uplands and on acid soils than *D. fuchsii*, but grading into the latter on intermediate sites. Ass: *Ranun fla, Epilo pal, Pedic syl, Succi pra, Juncu art, Molin cae.*
Locally frequent in W Cental hills; Clun Forest; and Clee hill areas: sparse elsewhere and v. rare in NE lowlands. First recognised in this region in early 1940s when it was recorded from Craven Arms area and Shirlett Common and confirmed by Dr T. Stephenson.

Early marsh-orchid

Dactylorhiza incarnata (L.) Soó
(*Orchis strictifolia* Opiz)

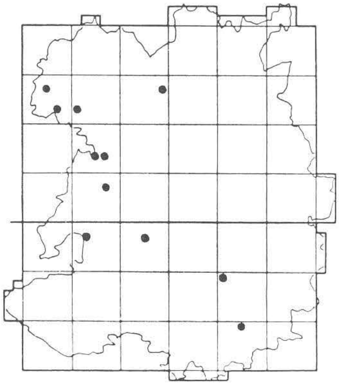


Fens and transition mires, wet meadows, reclaimed peatland, marshy hollows in fields, on moist to damp peat or poorly drained clay soils, PN poor to med, base med to rich, acid to calc, sunny, sheltered. Tolerant of light grazing, occasional mowing and trampling. Ass: *Ranun acr, Succi pra, Galiu pal, Poten ere, Molin cae, Carex pcea.*
Rare: scattered localities in Pant–Dovaston area; near Wem; and on Wem Moss; Muxton; Llanhowell near Clunbury.
ssp. **pulchella** (Druce) Soó recorded and confirmed from Llanhowell; Cramer Gutter; and near Coreley.
A possible hybrid with *D. fuchsii* has been seen at Dovaston.

Southern marsh-orchid

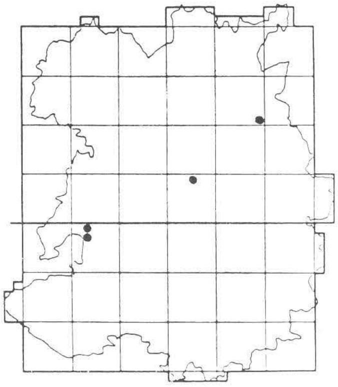
Dactylorhiza praetermissa (Druce) Soó
(*Orchis praetermissa* Druce)

Meadows and wet hollows in fields, marshy ground, flushes, valley mires, quarry floors and old clay pits, on damp to moist, poorly drained, often winter-wet clay soils or peat, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered, warm. Tolerant of grazing (esp by horses), trampling and occasional mowing. Ass: *Dacty fuc, Euphr spp, Leont his, Liste ova, Carex dem, Carex pcea.*
Sparse in lowland from Westbury area to Market Drayton, with outlying records at Cramer Gutter.
V. little of the Shropshire material of *D. praetermissa* is really pure. Hybrids with *D. fuchsii* are common and it probably crosses with other species of *Dactylorhiza.*
Probably first recorded by G Potts near Bridgnorth in the late 1930s.



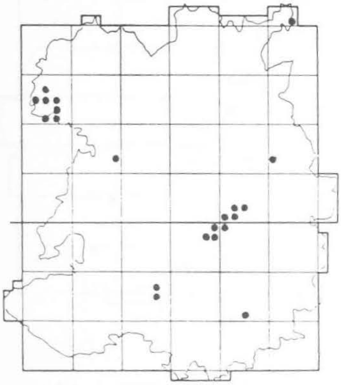
Northern marsh-orchid

Dactylorhiza purpurella (T. & T.A. Steph.) Soó
(*Orchis purpurella* T. & T.A. Steph.)



Damp meadows, pastures and valley mires, on poorly drained clay or peat, PN poor to med, base med, acid to neut, sunny. Tolerant of grazing, trampling and occasional mowing.
V. rare: the original Shropshire locality for this species was close to the roadside at Marsh Pool near Shelve, where it was found by HH Hughes in 1937 and indentified by Dr T Stephenson; it was still there until the early 1970s when the site was destroyed by draining, ploughing and reseeding. Another early record was from the Kerry area in v c 47, unfortunately not localised. Records from Attingham Park (1970 FHP) and from Old Caynton (1977 R Lees) have not recently been confirmed. The only known surviving locality is in the Hyssington Marsh area on the boundary of v c 40 and v c 47.

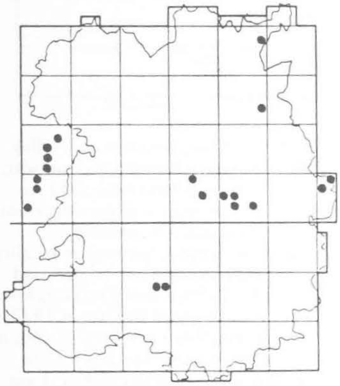
Pyramidal orchid
Anacamptis pyramidalis (L.) L.C.M. Richard



Grassland and grassy banks on limestone and on old quarry floors and spoil heaps, on shallow well drained, stony or loamy soils, PN poor, base rich, neut to calc, sunny, exposed. Tolerant of heavy grazing and trampling, one of the most reliable indicators of calcareous soils. Ass: *Linum cat, Sangu min, Black per, Plant med, Coelo vir, Briza med.*
Locally frequent in Oswestry uplands (limestone); NE end of Wenlock Edge; and Benthall area: with outlying localities at Cardeston; Muxton; Woore; View Edge; and Farlow.

ARUM FAMILY
ARACEAE

Sweet-flag
*__Acorus calamus__ L.



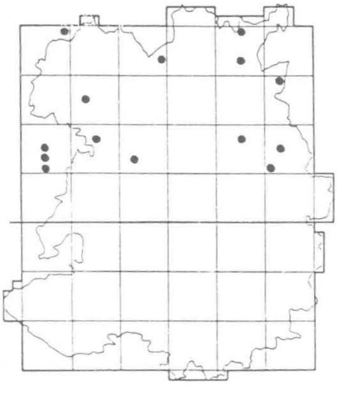
Introduced and well established in ponds and pools, disused reaches of canals, bogs and shallow margins of rivers, in muddy nutrient-rich waters. Locally frequent along R Severn from Wroxeter to Coalport; and in Montgomery branch of Shropshire Union Canal: scattered records elsewhere in NE and S. Apparently increasing.

Bog arum
*__Calla palustris__ L.
Naturalised in drained Saxon moat at Shawbury (1974 EAW); and introduced in a farm pool at Betton near Market Drayton (1977 APB).

Lords-and-ladies, Cuckoo-pint, Wild arum
'Dog's dick', 'Bull's dick'
Arum maculatum L.
Margins and open areas of woodland and scrub, hedgebanks, verges, edges of fields, wild gardens, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, ½ shade, sheltered. Tolerant of occasional mowing and trampling, generally avoided by grazing livestock. Ass: *Geum urb, Mercu per, Viola riv, Glech hed, Primu vul, Festu gig, Bromu ram.*
Frequent in wooded areas on base-rich soils throughout the region: less common in arable NE and in SW uplands.

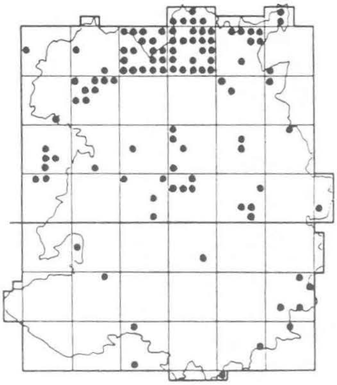
DUCKWEED FAMILY
LEMNACEAE

Greater duckweed
Lemna polyrhiza L.



Disused reaches of canals, pond, pools and reservoirs, floating on surface in open areas of still, shallow water, PN rich, base rich, neut to alk, sunny, warm, sheltered. Sensitive to unseasonal frosts, so population varies strikingly from year to year. Ass: *Lemna min, Hydro mor, Potam nat, Nupha lut, Cerat dem, Sparg ere.*
Sparse to locally frequent in N lowland.

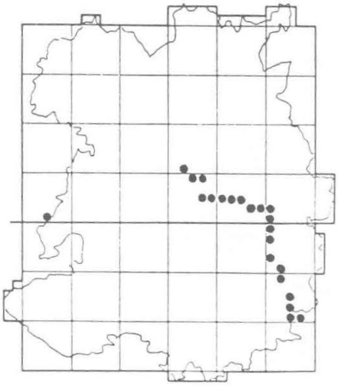
Ivy-leaved duckweed
Lemna trisulca L.
Pools, ponds, ditches and disused reaches of canals, partially submerged in clear, shallow water, PN rich, base rich, neut to alk, sun to ½ shade, sheltered. Often among luxuriant floating or emergent vegetation, less common in pure stands, tolerant of eutrophication and mild pollution. Ass: *Lemna min, Sparg ere, Potam nat, Nupha lut, Phrag aus, Juncu eff.*



Frequent in Oswestry–Ellesmere–Whitchurch area: locally frequent to sparse elsewhere in lowland: absent from most of hill country.

Common duckweed
Lemna minor L.
Ponds, pools, ditches, disused reaches of canals, backwaters of sluggish rivers and streams, floating on surface of still, mostly shallow water, PN rich, base rich, neut to alk, sun to ½ shade, sheltered. Often forming extensive pure stands, v. tolerant of eutrophication and pollution, often the last flowering plant to survive on farm ponds. Ass: *Calli sta, Lemna tri, Potam nat, Alism pla, Sparg ere, Ranun sce.*
Abundant in suitable habitats throughout region.

Fat duckweed
Lemna gibba L.



Rivers, ditches and canals in still or slow-flowing shallow nutrient-rich water. Ass: (at the Hem) *Calli ham, Rumex mar, Veron cat.*
Rare and sporadic or overlooked: recently (summer 1983) found in many reaches of R Severn between Shrewsbury and Bewdley by STNC Survey team (CGAP); also in former flood-meadows (the 'Old Flash') at The Hem

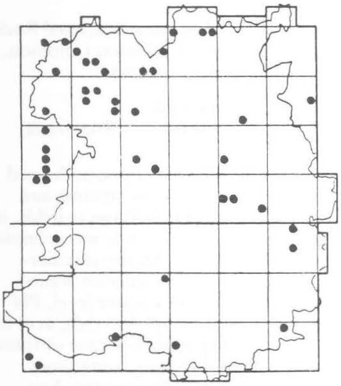
near Forden (v c 47, 1983 ICT). Formerly recorded from Shropshire Union Canal near Edgmond (1955 *TCSVFC*).

BUR-REED FAMILY
SPARGANIACEAE

Branched bur-reed
Sparganium erectum L.
(*S. ramosum* Huds.)

Margins of pools, ponds, ditches, disused reaches of canals, slow rivers and streams, in shallow water, rooted in bottom mud, PN rich, base rich, neut to alk, sunny, sheltered. Intolerant of grazing and trampling, often forming extensive stands, tolerant of eutrophication. Ass: *Typha lat, Glyce max, Rumex hyd, Alism pla, Butom umb, Lemna min.*
Frequent throughout region esp in lowlands.
The subspecies have not been consistently distinguished and mapped in the present survey, although ssp. **microcarpum** (Neuman) Domin has been recorded several times by BRF and ssp. **oocarpum** (Čelak.) Domin in *CSABF.*

Unbranched bur-reed
Sparganium emersum Rehmann
(*S. simplex* Hudson)



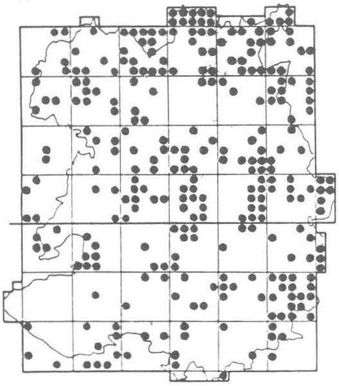
Ponds, pools, slow rivers, ditches and canals, including still-navigated reaches, rooted in bottom mud in fairly shallow, still or slow-flowing water, PN rich, base rich, neut to alk, sunny, sheltered. Sometimes only evident as a few ribbon-like leaves on the surface, but locally forming dense stands. Ass: canals – *Sparg ere, Butom umb, Glyce max, Berul ere, Rumex hyd;* rivers – *Ranun flu, Potam cri, Myrio spi.*
Locally frequent in NW lowlands: sparse elsewhere and absent from most of hill country.

Least bur-reed
Sparganium minimum Wallr.

Formerly confused with **S. angustifolium** Michx which is not known to occur in this region. Shallow, clear pools with variable water level, sometimes summer dry, rooted in peat or sand, PN poor, base poor, mod acid, sunny, sheltered, fairly tolerant of short periods of drought. A characteristic member of the rare oligotrophic pool community now most endangered by modern land use. Ass: *Eleog flu, Eleoc pal, Oenan fis, Balde ran, Poten pal, Ranun fla, Carex pse.*
Only known from two pools at Brown Moss. Formerly more widespread but inadequately recorded. Endangered.

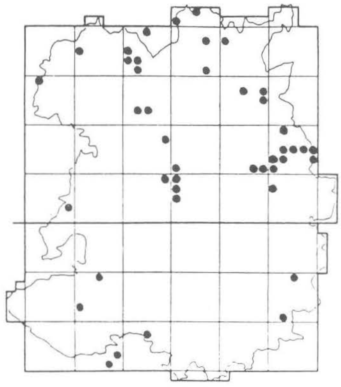
REEDMACE FAMILY
TYPHACEAE

Bulrush, Greater reedmace, False bulrush
Typha latifolia L.



Reedswamp at edges of pools, ponds, small meres, disused reaches of canal and in ditches and drains or on former sites of standing water, usu in shallow water or rooted in moist to wet mud, PN rich, base rich, neut to alk, sunny, sheltered. Often forming extensive pure stands and occasionally becoming detached from bottom as a floating raft. A mainly lowland plant apparently v. tolerant of pollution by domestic effluent. Ass: *Sparg ere, Carex amis, Carex pse, Solan dul, Lemna min.*
Frequent in suitable habitats throughout region except at higher altitudes.

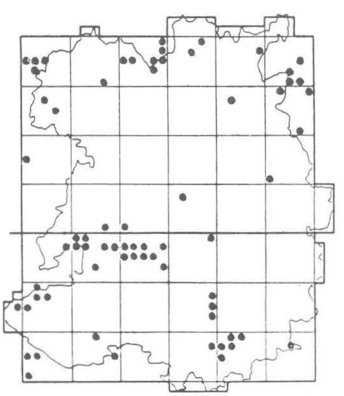
Lesser bulrush, Lesser reedmace
Typha angustifolia L.



Edges of meres, deep pools and ornamental lakes, bottom-rooted in clear standing water or forming a rhizome raft in sheltered sites, PN rich, base rich, neut to alk, sunny, sheltered. Generally in extensive pure stands. Mainly a plant of natural sites, much less common than *T. latifolia* in man-made ponds and ditches and less tolerant of pollution. Ass: *Schoe lac, Phrag aus, Cladi mar, Nupha lut.*
Locally frequent in the central parts of the N Shropshire plain: rare elsewhere and absent from hill country.

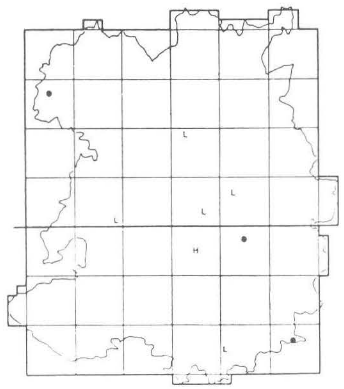
SEDGE FAMILY
CYPERACEAE

Common cottongrass
'Davy whiteheads', 'Sniggle'
Eriophorum angustifolium Honckeny



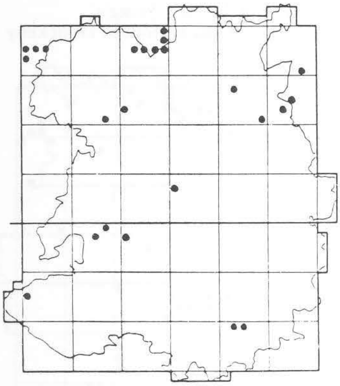
Wet hollows and bog pools, on peat mosses, moorland and wet heathland, PN poor, base poor, v. acid to mod acid, sun to ½ shade, exposed. Tolerant of mod grazing, often the first water plant to colonise old peat cuttings. Ass: *Eriop vag, Erica tet, Callu vul, Carex nig, Narth oss, Molin cae, Spha cusp.*
Locally frequent in Ellesmere–Whitchurch and Market Drayton areas; Oswestry uplands; W Central hills; Clee hills; and Clun Forest: sparse elsewhere.

Broad-leaved cottongrass
Eriophorum latifolium Hoppe



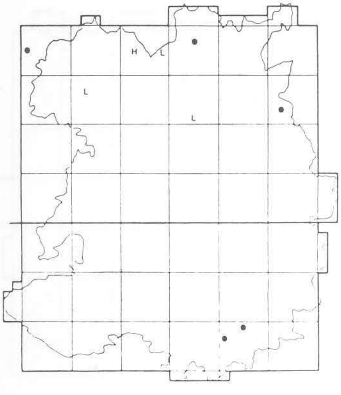
Spring fens and calcareous flushes, on wet to moist peat or clay, PN poor, base rich, mod acid to calc, sunny. Tolerant of trampling and light grazing, a poor competitor with tall sedges and grasses. Ass: *Valer dio, Carex lep, Carex pul, Epipa pal, Sagin nod, Camp stel.*
Rare: Trefonen; Shirlett; Wyre Forest (Dowles Brook). Formerly also known from Astley; below Easthope Wood; Mor Brook; and a bog on the SW side of Wrekin. Decreasing.

Hare's-tail cottongrass
Eriophorum vaginatum L.



Bogs, wet heaths and moorland, on damp to moist peat, PN poor, base poor, v. acid to acid, sunny, exposed. Tolerant of mod grazing and trampling, often dominant over extensive areas, flowers most vigorously a year after burning. Ass: *Eriop ang, Molin cae, Erica tet, Callu vul, Vacci oxy, Spha papi.*
V. locally frequent in Ellesmere–Whitchurch area; Oswestry uplands; Stiperstones; Catherton Common: sparse in NE and rare elsewhere.

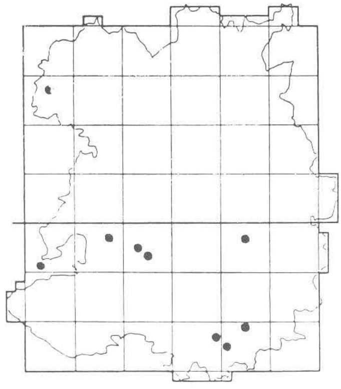
Deergrass
Trichophorum cespitosum (L.) Hartman
(*Scirpus caespitosus* L.)



Wet heath, moorland and bog, on moist to damp peat, PN poor, base poor, v. acid to acid, sunny. Favoured by grazing and trampling and tolerant of fire but surprisingly uncommon in this region. Ass: *Callu vul, Juncu squ, Carex nig, Carex ech, Molin cae, Vacci myr, Desch fle.*
Oswestry uplands; Hodnet Heath; Steel Heath; Puleston Bog; Catherton Common. Formerly also known from bogs in Ellesmere area; Rednal; and Shawbury Heath.

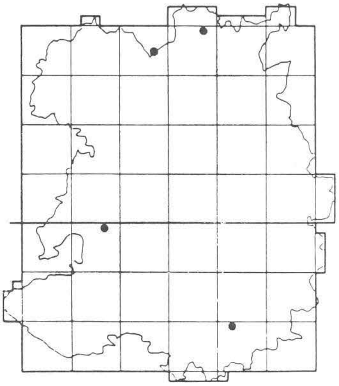
Needle spike-rush
Eleocharis acicularis (L.) Roemer & Schultes
Shallow margins of meres, rooted in muddy shingle, generally submerged but briefly exposed in exceptionally dry periods, PN rich, base rich, neut to acid, sunny, exposed. Probably favoured by wave action on shore and tolerant of grazing by geese and other waterfowl and of trampling by sailors and anglers, forming an extensive open sward. No constant associates.
V. rare: Ellesmere Mere; White Mere; also once found growing on muddy towpath bank of SUC (Prees Branch) near Dobson's Bridge (1963 CAS) but now probably extinct there; and from a similar site on Montgomery Canal (v c 47) NE of Guilsfield in 1955.

Few-flowered spike-rush
Eleocharis quinqueflora (F.X. Hartmann) O. Schwartz
(*E. pauciflora* (Lighf.) Link)



Spring fens, flushes and valley mires, on wet to moist peat or stony mud with seeping or trickling water, PN poor, base med to rich, acid to calc, sunny, cool. Tolerant of trampling and grazing but not of compet with taller plants, a characteristic member of the close-grazed sward around springs but easily overlooked and probably under-recorded. Ass: *Potam pol, Juncu art, Carex ech, Carex dio, Anaga ten, Trigl pal, Pingu vul.*
Local: Trefonen; Stiperstones; Boiling Well, Long Mynd; Shirlett, Titterstone Clee; and Catherton Common.

Many-stalked spike-rush
Eleocharis multicaulis (Sm.) Desv.

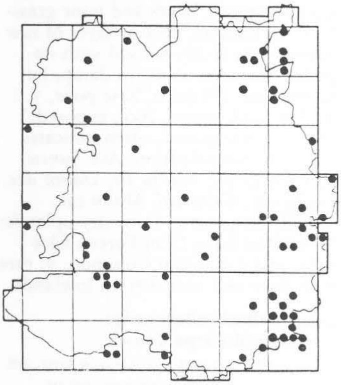


Bog pools, flushes and wet hollows in heathland, on wet to moist peat or in standing water, PN poor, base poor, v. acid to acid. Often locally dominant where it occurs. Ass: *Eriop vag, Drose rot, Rhych alb, Spha cusp, Drep flui, Gymn infl.*
Rare: Wem Moss; near Scattered Rock on Stiperstones; Catherton Common. Formerly at Brown Moss.

Common spike-rush
Eleocharis palustris (L.) Roemer & Schultes
Margins of ponds and pools, disused reaches of canals, slow streams and rivers, fens and wet hollows in fields, in shallow standing water or wet to moist mud or peat, often on the summer-exposed shore at the edge of water bodies with variable water level, PN poor to med, base med to rich, acid to alk, sunny, exposed. Tolerant of trampling and mod grazing, sometimes forming pure stands in water. Ass: *Oenan fis, Agros sto, Carex hir, Myoso lax, Galiu pal, Hydro vul, Juncu eff, Poten ans.*
Frequent in suitable habitats throughout region.

Sea club-rush
Scirpus maritimus L.
Known in the fish pond at Preston Montford at least since 1957, where until recently it formed a luxuriant 'reedswamp' around the margins. Formerly recorded also from Hawk Lake at Hawkstone. Probably introduced by birds at both localities.

Wood club-rush
Scirpus sylvaticus L.
Margins and clearings of alder woods and willow scrub, rough grassland and tall marshy meadows, in seepages, on wet to damp or seasonally flooded clay or silt, PN med, base med, mod acid to

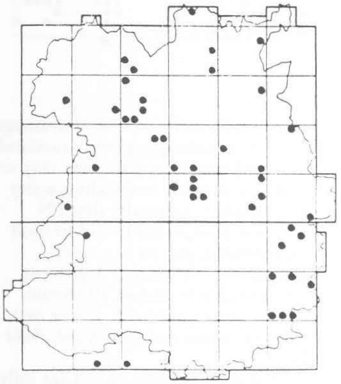


neut, ½ shade, sheltered. A vigorous competitor with other tall herbaceous plants, tolerant of light grazing. Ass: *Filip ulm, Angel syl, Calth pal, Achil pta, Carex amis, Eupat can.*
Locally frequent in Market Drayton area; Lower Severn Valley and Onny Valley: sparse elsewhere and mainly in lowlands.

Flat-sedge
†Blysmus compressus (L.) Panzer ex Link

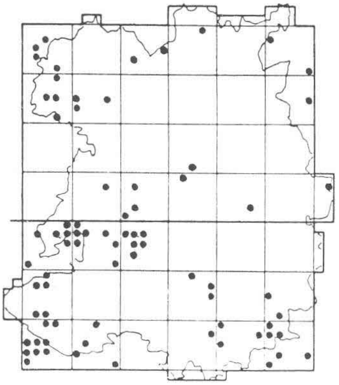
Extinct?
Recorded in *LFS* 'in a field at the bottom of Wenlock Edge, by the side of the road from Lutwyche to Kenley', by Beckwith from 'bog below Lushcott' and by Beacall from Easthope Wood (1886): these probably all refer to the same locality. Also recorded by Serjeantson from Church Preen (1878). There have been no records during the present century, but the plant could still occur in other spring fen or flush sites.

Common club-rush
Schoenoplectus lacustris (L.) Palla



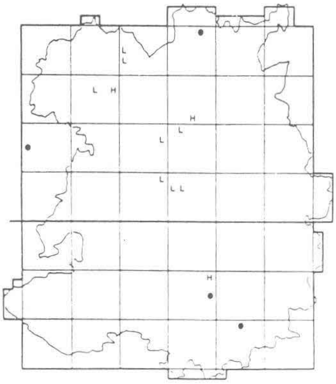
Margins of meres, pools and sluggish rivers, in deep water, rooted in mud or silt, PN med to rich, base med to rich, neut to alk, sunny, sheltered. Intolerant of grazing, esp by geese, and of trampling, often in pure stands. Ass: *Phrag aus, Typha ang, Nupha lut.*
A lowland plant in this region. Locally frequent in Ellesmere district; and Severn Valley from Shrewsbury to Bewdley: sparse elsewhere. Much decreased in recent years possibly because of growing population of Canada geese.
Grey club-rush **S. tabernaemontani** (C.C. Gmelin) Palla, now treated as a subspecies of *S. lacustris*, has been recorded from Crose Mere and White Mere but not seen in recent years.

Bristle club-rush
Isolepis setacea (L.) R.Br.



Bare or trampled places in hillside flushes and rills, less commonly on marshy ground in lowlands, on wet to moist mud, clay or peat, PN poor to med, base med, mod acid to neut, sun to ½ shade, cool, sheltered. Tolerant of heavy trampling and mod grazing, often a pioneer species in cattle hoof prints. Ass: *Carex dem, Juncu bul, Juncu buf, Gnaph uli, Stell als.*
Locally frequent in Oswestry uplands; W Central hills; Clee hills; Wyre Forest: sparse in Ellesmere area and elsewhere on plain but probably overlooked.

Floating club-rush
Eleogiton fluitans (L.) Link

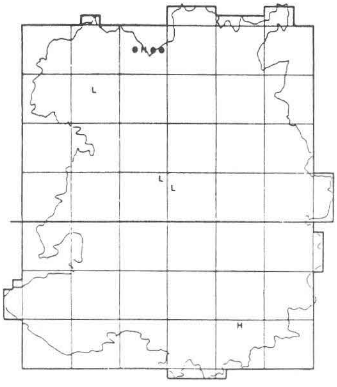


Ponds, pools, slow streams and ditches, floating in shallow clear water, rooted in peat, sand or silt, PN poor, base poor, acid to mod acid, sunny. Tolerant of occasional drought and of light trampling and grazing, often in pure stands. Ass: *Juncu bul, Apium inu, Sparg min, Balde ran, Eleoc pal.*
Rare: Brown Moss; Boyne Water, Burwarton; Silvington Common; also in a peat pool S of Gaer Bank (v c 47). Formerly known from many localities in Ellesmere and Shrewsbury areas. Severe decrease.

Black bog-rush
Schoenus nigricans L.

Recorded in *ABF* for SJ53 but no details available. No earlier or later records for Shropshire, but recorded at Moreton Moors (v c 39) by Bagnall in 1901.

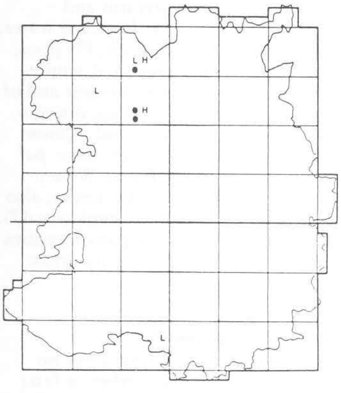
White beak-sedge
Rhynchospora alba (L.) Vahl



Pools and peat cuttings in bogs, on wet to moist peat or in shallow standing water, often growing on a carpet of sphagnum, PN poor, base poor, v. acid to acid, sunny, sheltered, ungrazed. Ass: *Vacci oxy, Drose rot, Eriop ang, Narth oss, Erica tet, Spha cusp, Spha papi.*
Said to be the food-plant of the large heath butterfly, one race of which reaches its southern limit on the Shropshire mosses.
Rare: Clarepool Moss; Wem Moss; Worldsend Moss. Formerly also known from Twyford Vownog and Bomere.

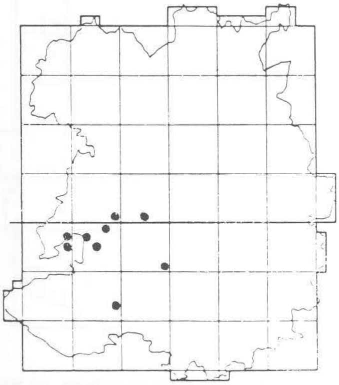
Great fen-sedge
Cladium mariscus (L.) Pohl

Edges of meres and pools in shallow shore between reedswamp and sedge tussocks, rooted in peat or mud below permanent water level, PN rich, base rich, neut to alk, sunny, sheltered, forming a v. local dominant band. Ass: *Phrag aus, Typha ang, Carex pata.*
Rare: Crose Mere; NW shore of Birchgrove Pool; The Yesters near Baschurch. Formerly recorded from



Cole Mere; Rednal; Lyneal; Berth Pool; Oakly Park near Ludlow. Shown in *ABF* for SO 38.

Smooth-stalked sedge
Carex laevigata Sm.



Wet gullies, dingles, rocky stream banks, flushes, hollows in woods, rough grassland or open moorland, on wet to moist clay or peat with seeping or trickling water, often associated with iron flushing, PN poor, base poor to med, acid to mod acid, ½ shade, sheltered, little grazed. V. locally abundant where it occurs. Ass: *Dryop car, Equis syl, Ranun fla, Carex dem, Lychn flo, Lotus uli, Juncu art, Hyper tet, Hydro vul, Desch cae.*

Locally frequent in upper parts of Habberley Valley and West Onny tributaries; W slopes of Corndon and Stapeley hills; Smethcott Dingle; Cardington Hill; and Hopesay Hill.

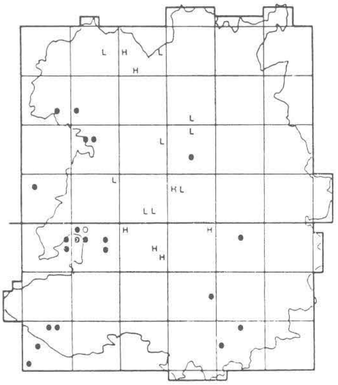
Distant sedge
†Carex distans L.

Presumably extinct.

Recorded in the Rev E Williams' lost MSS; repeatedly searched for in his localities – Shawbury Heath; moist meadows about Eaton Mascott; Pitchford and Golding; under the Wrekin – by both Leighton and Beckwith. There is a Beckwith specimen from Eaton Constantine in **SHY** (det SMW). Hamilton wrote in *HFS* "The records are given as they stand and are perhaps rather of antiquarian than botanical value, it now being impossible to say whether the plants were *C. distans* or *C. binervis* which is often named *distans*. But *distans* certainly does occur inland."

Leighton considered Williams reliable on *Carex*, and the habitats at the sites listed were on the whole more suitable for *distans* than *binervis.*

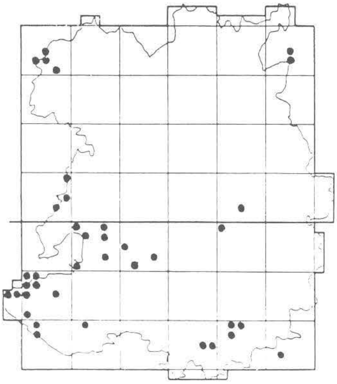
Tawny sedge
Carex hostiana DC.



Rich flushes in upland moor and pasture, valley mires and fen, on moist clay, loam or peaty soil, PN poor, base med to rich, mod acid to calc, sunny, exposed. Tolerant of light grazing and trampling. Ass: *Carex pcea, Carex pul, Juncu art, Pedic pal, Viola pal, Ranun fla.*

V. locally frequent in Stiperstones and Corndon area; and in extreme SW of region: sparse elsewhere on edges of W upland and Clee hills: V. rare in lowland. Formerly quite common in NW and Central parts of Shropshire. Severe decrease probably due to improvement of agricultural land.

Green-ribbed sedge
Carex binervis Sm.



Upland moors, heath and poor grassland, on shallow peat or layer of raw humus over heavy subsoil with impeded drainage, moist to damp, but winter-wet, PN poor, base poor, v. acid to acid, sunny, cool, exposed, little to mod grazed, often indicates incipient podzolization. Ass: *Juncu squ, Carex pil, Nardu str, Danth dec, Galiu sax, Callu vul, Molin cae.*

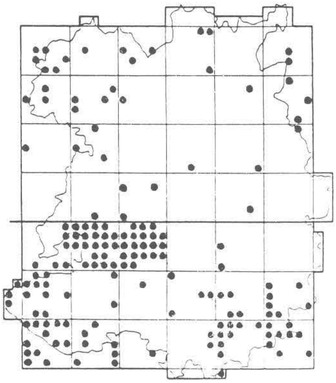
Locally frequent in Oswestry uplands; W Central hills; Clun Forest; Clee hills; and Catherton Common: v. rare elsewhere and absent from lowlands.

Long-stalked yellow-sedge
Carex lepidocarpa Tausch

Spring flushes and calcareous fens, on wet to moist peat with seeping or trickling water, PN poor, base med to rich, neut to calc, sunny, cool, exposed. Tolerant of grazing and favoured by trampling. Ass: *Carex fla, Carex pcea, Carex pul, Valer dio, Galiu uli, Sagin nod, Juncu art, Trigl pal.*

Rare: Trefonen; Crose Mere. Records for this species from the Stiperstones and Clun Forest areas probably refer to *C. demissa.*

Common yellow-sedge
Carex demissa Hornem.



Flushes, runnels, hollows and drainage ditches in moorland, upland grassland or lowland mires, on bare, wet clay or shallow peat, often in trickling water but sometimes seasonally dry, PN poor, base poor to med, acid to mod acid, sheltered, sun to ½ shade, ungrazed to little grazed. A pioneer colonist of drains and small stream channels. Ass: *Carex ech, Carex ova, Ranun fla, Juncu bul, Juncu art, Aula palu.*

Frequent in W Central hills; Clee hills; Wyre Forest; and Clun Forest: sparse elsewhere and predominantly an upland plant.

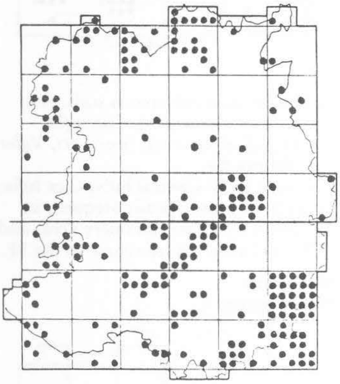
The hybrid *C. demissa × hostiana* has been recorded from Corndon Hill

(PMB): and Catherton Common (1962 CAS: **SHY**).

Small-fruited yellow-sedge
†Carex serotina Mérat

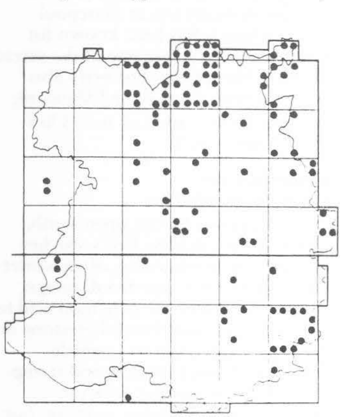
Casual.
Appeared in great quantity on the exposed shore of one of the pools at Brown Moss in the summer of 1963, but had gone by the following year and has not been seen since: presumably from bird-sown seed.

Wood-sedge
Carex sylvatica Hudson



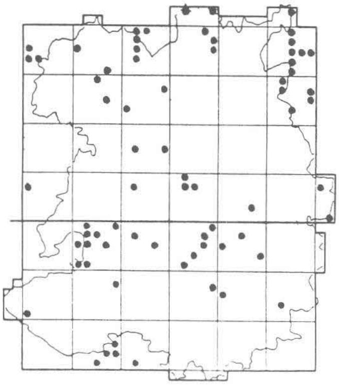
Herb-rich broad-leaved woodlands, most abundant in rides, clearings and margins usu on heavy, moist to damp clay soils, often over limestone, PN med, base med to rich, mod acid to calc, shade to ½ shade, sheltered. Tolerant of light grazing and trampling. Ass: *Festu gig, Bromu ram, Sanic eur, Carex rem, Ajuga rep, Veron mon.*
Frequent in Wenlock Edge–Telford area and Lower Severn Valley: locally frequent in Ellesmere area; Oswestry uplands; Clee hills platform; and Clun Forest: sparse elsewhere.

Cyperus sedge
Carex pseudocyperus L.



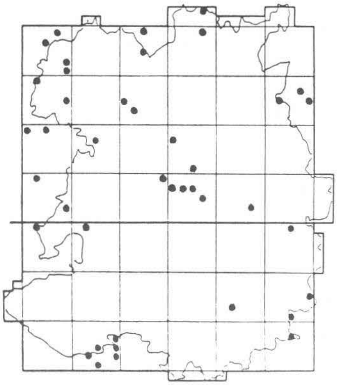
Margins of shallow stagnant ponds and on intermittently flooded patches of bare organic mud or wet areas in willow and alder carr, usu PN rich (but occasionally poor), base med to rich, mod acid to calc, sun to ½ shade. A characteristic pioneer species on rich bare mud but intolerant of compet with tall sedges and of grazing. Ass: *Carex amis, Alism pla, Solan dul, Juncu eff, Hydro vul, Eleoc pal.*
Frequent in Ellesmere–Whitchurch area and in parts of Lower Severn Valley: local elsewhere in lowlands and absent from hill country.

Bottle sedge
Carex rostrata Stokes



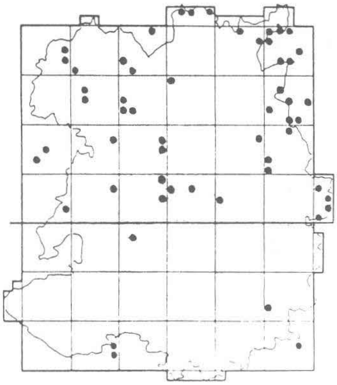
Fens, edges of slow flowing streams, pools and ponds, in shallow slow flowing or standing water or on wet to moist, often peaty soils, PN poor to med, base poor to rich, acid to calc, sunny, often exposed. Mod tolerant of grazing, sometimes forming extensive pure stands. Ass: *Carex ves, Eriop ang, Polyg amp, Equis flu, Poten pal, Eleoc pal.*
The aquatic form of this species is of v. different habit from the form found on marshy soils, but they grade into one another and are probabaly not genetically distinct.
Locally frequent in Whitchurch area and W Central hills: sparse elsewhere in both upland and lowland.
The hybrid with C. *vesicaria*, **C. × involuta** (Bab.) Syme, has been recorded from Marsh Pool (1958 CAS: site now destroyed) and Brown Moss (1959 CAS).

Bladder-sedge
Carex vesicaria L.



Fens, edges of shallow streams, ponds and pools, in still or slow flowing water or on wet to moist, often peaty soils, PN med, base med, mod acid to neut, sunny, intolerant of heavy grazing, often forming dense pure stands. Ass: *Carex ros, Eleoc pal, Poten pal, Galiu pal, Hydro vul, Spha squa.*
Local in Shrewsbury–Cressage and Leintwardine area: sparse elsewhere in NW and Lower Severn Valley: absent from much of hill country and NE lowlands.

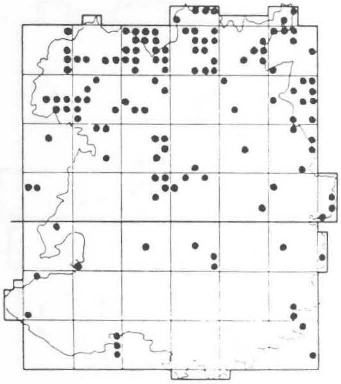
Greater pond-sedge
Carex riparia Curtis



Edges of ponds, slow rivers and disused reaches of canals and occasionally in marshy hollows, in shallow water or on wet to damp seasonally flooded clay, silt or peat, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, sheltered, often forming extensive pure stands. Ass: *Filip ulm, Epilo hir, Solan dul, Phala aru, Salix fra, Sparg ere.*
Locally frequent in E, S and W parts of plain: rare elsewhere and absent from uplands.

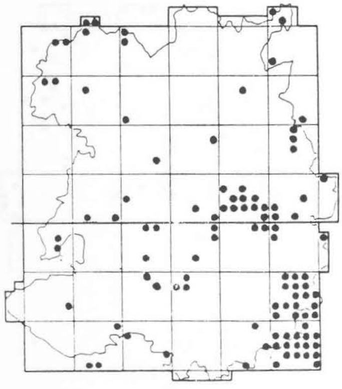
Lesser pond-sedge
Carex acutiformis Ehrh.

Edges of ponds, pools, slow flowing rivers and canals, ditches and in damp woodland and hollows in fields, in shallow standing water or on intermittently flooded bogs, rooted in silt, clay or peaty soil, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, often forming extensive pure stands. Ass: *Epilo hir, Solan dul, Menth aqu, Myoso sco, Sparg ere,*



Rumex hyd, Iris pse, Calth pal.
Frequent in N and W lowlands: local in SE and NE: sparse elsewhere and absent from most of the higher ground.

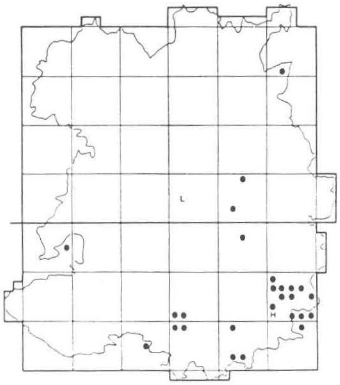
Pendulous sedge
Carex pendula Hudson



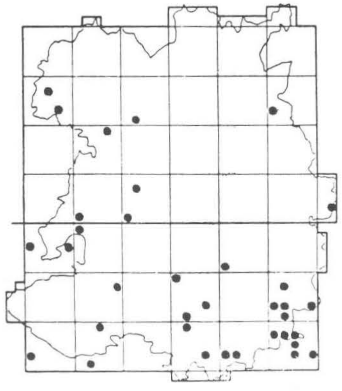
Dingles, damp ravines and flushes in woods, on clay, PN med, base med, mod acid to neut, ½ shade or shade, intolerant of grazing. Ass: *Urtic dio, Epilo hir, Festu gig, Carex rem, Desch cae, Ranun rep, Equis tel, Scirp syl.*
Patchy but locally abundant. Formerly grown as an ornamental plant and no doubt naturalised in some localities. Frequent in Lower Severn Valley and Ironbridge area: locally frequent elsewhere in mid-Shropshire and NW: sparse elsewhere and absent from most of hill country.

Thin-spiked wood-sedge
Carex strigosa Hudson

Clearings, rides, damp hollows, ravines and stream banks in old broad-leaved woodland, on wet to damp heavy clay soils, PN med, base med to rich, mod acid to neut, ½ shade to shade, sheltered, ungrazed but tolerant of occasional mowing. A characteristic member of the ground flora along tracks through ancient woods on heavy base-rich soils. Ass: *Ajuga rep, Carex rem, Lysim nem, Desch cae, Festu gig, Chrys opp.*
Locally frequent in Lower Severn Valley and S part of Clee hills platform: sparse in Telford area: with an outlying site at Coalpit Plantation, Chipnall, near Market Drayton.



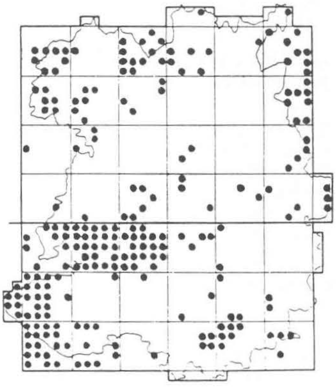
Pale sedge
Carex pallescens L.



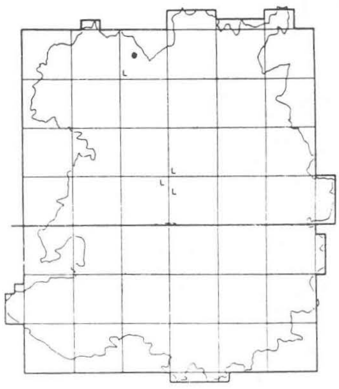
Fens, old meadows, stream banks, open scrub, edges of woodland, clearings and rides, on moist to damp heavy soils, often over limestone, PN poor to med, base med to rich, mod acid to calc, sun to ½ shade. Ass: *Carex fla, Carex hir, Juncu inf, Carex syl, Desch cae, Lotus uli, Filip ulm, Ajuga rep, Angel syl, Ranun acr.*
Locally frequent in SE: sparse in SW and W: absent from most of NE plain.

Carnation sedge
Carex panicea L.

Flushes, valley mires, fens, old species-rich grassland, ditch banks, damp woodland rides, on moist, often clay soils with trickling water, PN poor, base med to rich, mod acid to calc, sun to ½ shade. Tolerant of grazing and trampling but not of compet with tall grasses. Often marks iron-enriched flushes on non-calcareous soils. Ass: *Carex hos, Carex dem, Carex fla, Carex pul, Briza med, Juncu art, Valer dio, Ranun fla.*
Frequent in W Central hills; Clee hills; and Clun Forest: locally frequent in Oswestry uplands; Ellesmere area; and NW lowlands: rather sparse in the SE.



Bog-sedge
Carex limosa L.



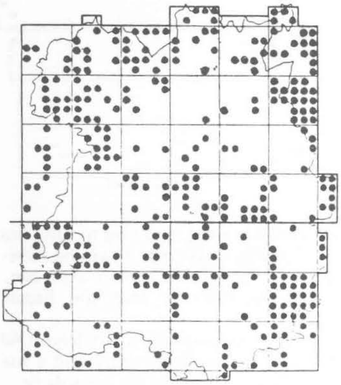
A single plant on a wet acid lawn of *Sphagnum recurvum* at Clarepool Moss, where it has been known for many years. Probably one of the rarest plants in Shropshire. Formerly also recorded from Bomere and Shomere; Weeping Cross; and Lee near Ellesmere. Endangered.

Glaucous sedge
Carex flacca Schreber

Pastures, grassy banks, open scrub, quarry floors, marshy fields, ditches and fens, on moist to dry, often winter-wet soils or with impeded drainage, PN poor to med, base rich, mod acid to calc, (usu associated with limestone or lime-rich rocks), sun to ½ shade. Tolerant of heavy grazing and trampling but not of compet with tall grasses. The commonest sedge on fairly dry base-rich soils. Ass: *Carex car,*

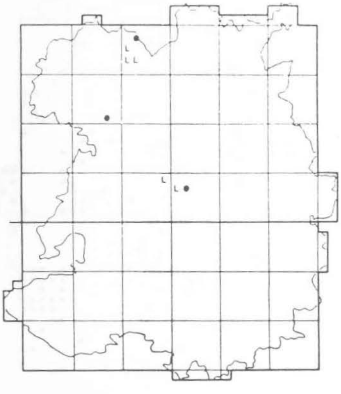
Carex pcea, Briza med, Leont aut, Succi pra, Sangu min.
Frequent in suitable habitats throughout region though less common than formerly in intensively farmed areas.

Hairy sedge
Carex hirta L.



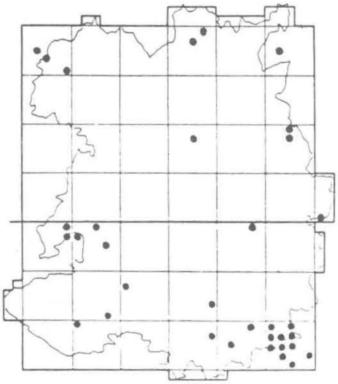
Old grassland and grassy heathland, damp roadside verges and ditch banks, open scrub and woodland margins, on moist to damp, often winter-wet loam or clay soils, PN poor to med, base med to rich, mod acid to neut, sun to ½ shade, fairly tolerant of disturbance and light grazing. Ass: *Loliu per, Cynos cri, Alope gen, Agros can, Poten ang, Galiu pal, Molin cae, Juncu acu.*
Locally frequent throughout region except at higher altitudes.

Slender sedge
Carex lasiocarpa Ehrh.



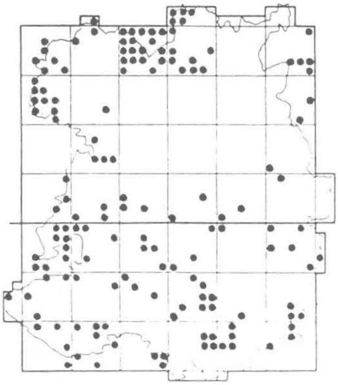
Shallow margins of pools and in wet hollows in peat bogs, either in standing water or on waterlogged peat, PN poor, base med to poor, acid to mod acid, sunny, sheltered, forming rather locally dominant stands. Ass: *Carex ros, Eriop ang, Carex cur, Erica tet, Spha recu.*
Rare: By old railway near Ellesmere; Wem Moss; Berrington Moss; Lin Can Moss. Seldom flowering and fruiting except in the wettest conditions. Formerly recorded from several other sites in Ellesmere area; Bomere; and Knockin Heath, but never common.

Pill sedge
Carex pilulifera L.



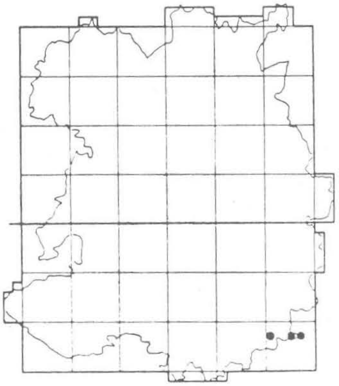
Heath, moor and acid grassland, on damp to dry but poorly drained soils with thick raw humus layer, PN poor, base poor, acid, sunny and open. Fairly tolerant of grazing and trampling but never present in great quantity. Ass: *Carex bin, Juncu squ, Nardu str, Polyg ser, Danth dec, Galiu sax, Poten ere.*
Locally frequent in Wyre Forest area: sparse elsewhere but scattered throughout region in suitable habitats.

Spring-sedge
Carex caryophyllea Latour.



Old species-rich grassland, stony or rocky hillsides and quarry floors, on dry shallow soils, PN poor to med, base med to rich (often on limestone or other base-rich rock), sunny, exposed. Tolerant of heavy grazing esp by rabbits but not of ploughing nor of compet with tall grasses. Ass: *Briza med, Festu ovi, Agros cap, Plant lan, Leont aut, Thymu pra, Campa rot.*
Locally frequent in uplands, sparse elsewhere in hill country and probably rare in N plain.

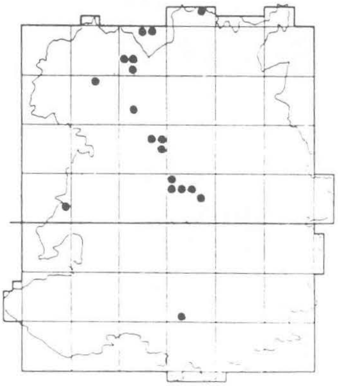
Soft-leaved sedge
Carex montana L.



Warm banks, heathy clearings and tracksides in old oak woodland, on dry to damp, shallow stony or sandy soils, PN poor, base poor to med, acid to mod acid, sun to ½ shade, sheltered. Occasionally forming extensive patches but few plants flowering. Ass: *Desch fle, Eupho amy, Luzul pil, Melic nut, Oxali ace, Teucr sco.*
V. rare: known from several sites in Wyre Forest, some of them on Shropshire side of Dowles Brook: absent elsewhere in region. Almost a national rarity, but not under any apparent threat in Wyre.

Fingered sedge
Carex digitata L.
Recently discovered in ancient mixed broad-leaved woodland on steep limestone hillside in Tickwood (1977 CW): first county record. Formerly recorded from North Wood, Bewdley. (v c 37).

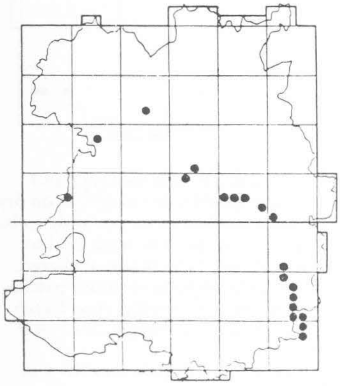
Tufted-sedge
Carex elata All.



Edges of meres and pools, in fen, willow and alder carr, on moist to wet peat, PN rich, base rich, neut to calc, sun to shade, sheltered, intolerant of grazing and trampling, often forming tall dense tussocks on bare peat between alder trees. A characteristic species for the group of habitats closely associated with the Shropshire meres. Ass: *Carex pata, Calam can, Ranun lin, Calth pal, Thely the.*

Locally frequent in the meres distict from Ellesmere to Cound; with outlying localities near Whitchurch; and in a pond at Witchcot near Hopton Cangeford.

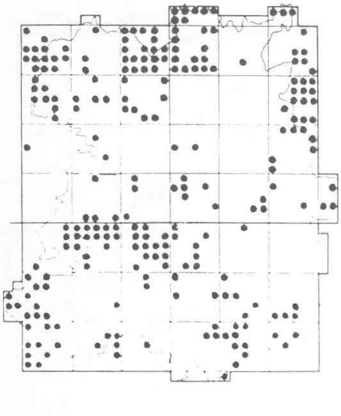
Slender tufted-sedge
Carex acuta L.



Shallow water and muddy banks in flood zone at edge of larger rivers, rooted in alluvial mud, PN rich, base rich, alk, sunny, warm, sheltered. Tolerant of frequent flooding and resistant to uprooting by river in spate. Ass: *Butom umb, Glyce max, Sparg ere.*

Locally frequent along banks of R Severn, increasing in abundance from Buildwas down to Bewdley: also recorded recently from Fenemere (1980 M. Wigginton).

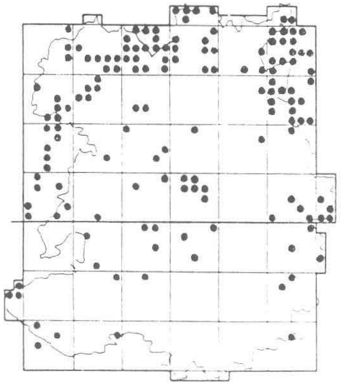
Common sedge
Carex nigra (L.) Reichard



Flushes, valley mires, wet heath, marshy hollows in species-rich grassland, on moist to damp, often winter-wet soils or peat, PN poor, base med, acid to mod acid, sun to ½ shade, exposed, tolerant of heavy trampling and light grazing. Ass: *Carex ova, Carex pcea, Carex ech, Carex cur, Nardu str, Agros can, Poten ere, Molin cae, Poly comm, Aula palu.*

A v. variable species but the forms have not been distinguished in the present survey. Frequent in Ellesmere–Whitchurch area; Oswestry uplands; W Central hills; Clee hills; and Clun Forest: sparse elsewhere and absent from parts of NE lowland.

Greater tussock-sedge
Carex paniculata L.

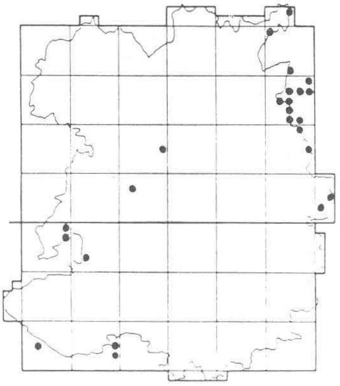


Beside meres, slow flowing ditches, rivers and canals, in fen, swamp, carr and open woodland, often forming tussocks in standing water or on wet peat with a permanently high water-table, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, not v. tolerant of grazing or heavy shade. This species has an important role in the succession from open water to relatively dry woodland. Old tussocks, which may reach almost 1m in height and diameter, form an interesting and distinct habitat for woodland plants including seedlings of willow and alder. Ass: *Carex amis, Carex ela, Phrag aus, Ranun lin, Epilo hir;* growing on tussocks – *Valer off, Geran rob, Solan dul, Oxali ace, Ribes nig.*

Frequent in N and NW lowlands: local along Severn Valley from Shrewsbury to Bridgnorth: rather sparse elsewhere and absent from much of the hill country.

The hybrid with *C. remota*, **C × boenninghausiana** Weihe, has been recorded beside the Prees Branch of the SUCanal (1973 CAS).

Brown sedge
Carex disticha Hudson



Fens and meadows, on moist to damp, winter-flooded clay or peat, PN med, base med to rich, mod acid to calc, sun to ½ shade, ungrazed, flowering infrequently. Ass: *Carex amis, Calam can, Phala aru, Valer off, Filip ulm, Eupat can.*

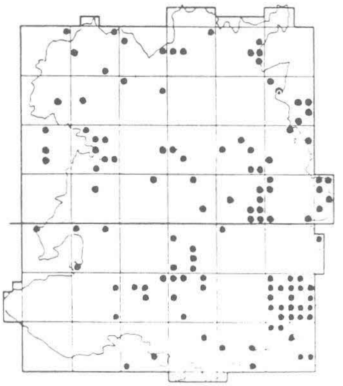
Sparse or overlooked: apart from Old River Bed N of Shrewsbury and a site near Plealey, most of the records lie close to the NE and SW county boundaries.

Lesser tussock-sedge
†Carex diandra Schrank

Extinct?

The most recent known record was from "Whixall, Ellesmere etc." (1956 AMcGS). Formerly known from Hencott Pool; Cole Mere; Shomere; Bomere; Crose Mere; near Whitchurch; by the side of a ditch between Adeney and Batterey, near Edgmond; near Oswestry (*LFS* and *HFS*).

False fox-sedge
Carex otrubae Podp.



(Formerly recorded incorrectly as *C. vulpina*).

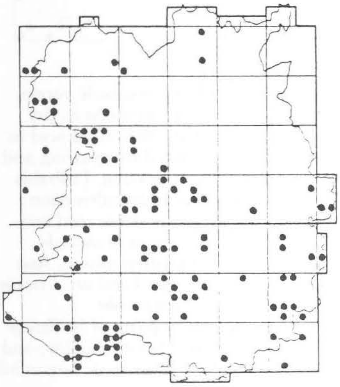
Ditches, banks of rivers and disused canals, badly drained roadsides, on moist to damp heavy soils, PN med to rich, base rich, neut to calc, sunny, open, ungrazed. Persisting in tall vegetation but tolerant of occasional mowing. Ass: *Carex hir, Carex pata, Juncu*

inf, Lathy pra, Desch cae, Phala aru, Stach pal.
Frequent in Lower Severn Valley: locally frequent around Melverley and Coalport areas: sparse elsewhere and absent at higher altitudes.
C. × pseudoaxillaris K. Richt., the hybrid with *C. remota*, has been recorded from Shrewsbury (1887 J Ball); and near Pitchford (D Turner).

Grey sedge
Carex divulsa Stokes ssp. **divulsa**

Roadside verges and banks, gardens and woodland rides, on moist to damp soils, PN med, base med to rich, mod acid to calc, ½ shade, ungrazed.
Rare: a garden weed in Munslow (1974 KMS and MSF); Neen Savage (1977 EHW); Dowles (1979 JB); Stevenshill (1980 PP); in v c 47 at Powis Castle (1978 FHP).

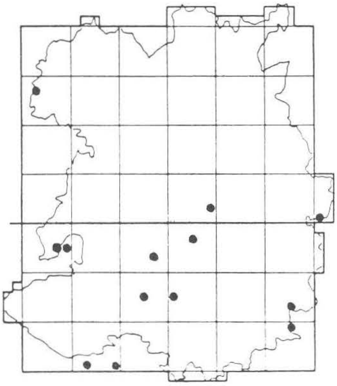
Prickly sedge
Carex muricata L.
ssp. **lamprocarpa** Čelak. (*C. pairaei* F.W. Schultz)



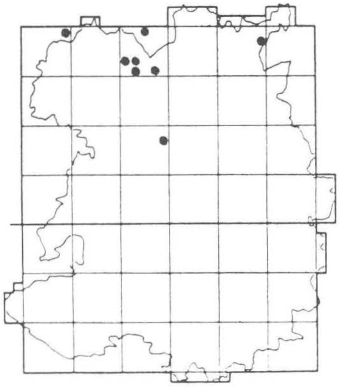
Grassy and rocky hillsides, open scrub, woodland clearings, hedgebanks and roadside verges, on dry, often shallow or stony soils, PN poor to med, base med, acid to mod acid, sunny, warm. Tolerant of light grazing or mowing, occasionally forming dense local patches. Ass: *Festu rub, Poa pra, Arrhe ela, Malva mos, Linar vul, Lathy pra, Luzul cam.*
Scattered but locally frequent in S and W of region: rare or overlooked in NE lowland and absent from highest hills. The commonest member of this difficult group, not always correctly distinguished from *C. spicata.*

Spiked sedge
Carex spicata Hudson
(*C contigua* Hoppe)

Old grassland, hedgebanks, grassy verges and walls, on dry, often stony or sandy soils, PN poor, base med to rich, mod acid to calc (sometimes associated with limestone), sunny, warm. Tolerant of light grazing or occasional mowing, generally occuring as solitary plants. Ass: *Briza med, Festu rub, Vulpi bro, Hiera pil.*
Sparse or overlooked: mainly in S of region with an outlying record near Wernddu.



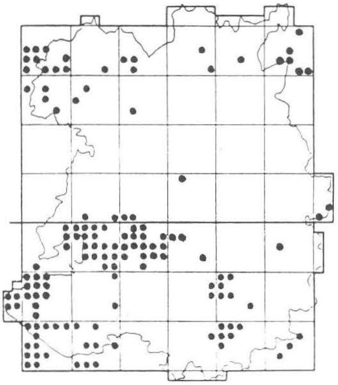
Elongated sedge
Carex elongata L.



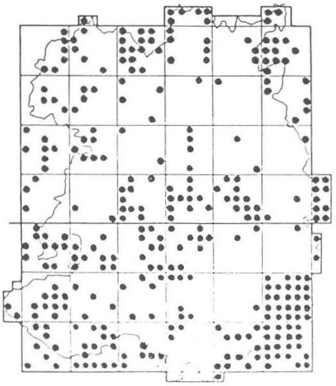
Wet alder carr at edges of meres and pools, canal banks, ditches, on permanently wet to moist peaty soils, PN rich, base rich, mod acid to calc, ½ shade to shade, sheltered, ungrazed. Ass: *Carex pata, Carex rem, Carex ela, Calth pal, Solan dul, Lysim vul, Ranun lin.*
Colemere; Sweat Mere; White Mere; Brownheath Moss: Hencott Pool; Betton Moss; and at Hanmer Mere and canal bank near Chirk in vc 50. This species was regarded as v. rare by earlier botanists and may have increased during the present century.

Star sedge
Carex echinata Murray

Flushes, valley mires, wet hollows and tracks in moorland, rough grassland and upland heath, on wet to damp soils with seeping water, PN poor, base poor to med, acid to mod acid, sun to ½ shade, exposed, tolerant of light grazing. Ass: *Carex ova, Carex dem, Molin cae, Juncu bul, Poten ere.*
Locally frequent in Oswestry uplands; W Central hills; Clee hills; and Clun Forest: sparse in N parts of lowland: absent from much of NE.



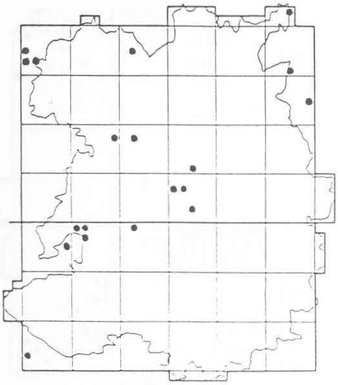
Remote sedge
Carex remota L.



Dingles, ravines, banks of streams, ditches and pools in woodland, often on wet to moist bare organic mud or clay, PN med, base med to rich, mod acid to neut, ½ shade or shady. Intolerant of compet and grazing, usu forming isolated clumps. Ass: *Carex syl, Ajuga rep, Athyr fil, Desch cae, Chrys opp, Carda fle.*
Frequent in SE: locally frequent to sparse throughout rest of region.

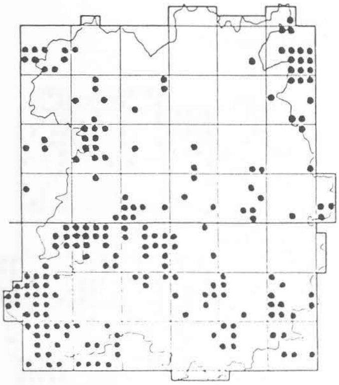
White sedge
Carex curta Good.

Hollows in birchwood, heathland or moorland, on wet to moist peaty mud, PN poor, base poor, acid, ½ shade, sheltered, usu ungrazed. A poor competitor with more vigorous sedges and grasses except in shady sites. Ass: *Molin cae, Agros can, Carex nig, Viola pal, Poly comm, Spha palu, Spha fimb.*
V. locally frequent in Oswestry upland; Bomere – Berrington area; and



Shelve area: sparse elsewhere in N: Absent from most of E and S.

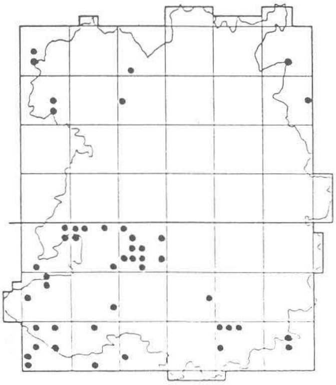
Oval sedge
Carex ovalis Good.



Flushes and hollows in rough grassland and heath, on heavy sometimes stony land with impeded drainage and seeping water, on damp to moist soils, PN poor, base poor to med, acid to mod acid, open, sunny, tolerant of trampling and grazing. Ass: *Carex ech, Carex nig, Carex dem, Carex pcea, Agros can, Danth dec, Molin cae, Poten ere.*
Locally frequent in Oswestry upland; Alberbury area; W Central hills; Clee hills; Clun Forest: sparse elsewhere and absent from much of N.

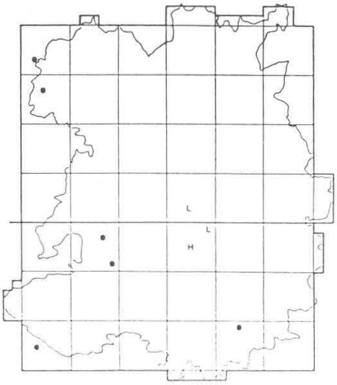
Flea sedge
Carex pulicaris L.

Flushes, valley mires, short fen, damp meadows and calcareous grassland, on wet to dry, often peaty or shallow stony soils, PN poor to med, base med to rich, acid to calc, sunny, cool. Tolerant of heavy grazing and trampling but not of compet with tall grasses. Ass: *Carex pcea, Succi pra, Trigl pal, Valer dio, Briza med, Carex hos, Gymna con, Centa nig.*
Locally frequent on Long Mynd; Corndon area; Catherton Common;



SW Clun Forest; and Oswestry uplands: sparse elsewhere and absent from most of N and E.

Dioecious sedge
Carex dioica L.

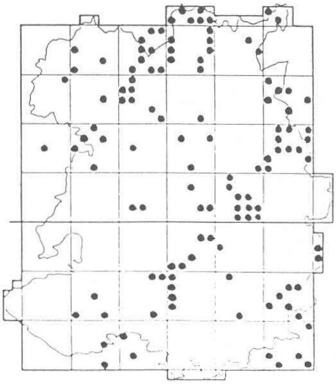


Spring fens, flushes and base-rich valley mires, on wet peaty or stony soils, PN poor, base med to rich, mod acid to calc, sunny. Tolerant of grazing and trampling, a v. poor competitor because of its small size.
Rare but possibly overlooked: Trefonen; The Knolls near Stiperstones; Asterton; Cramer Gutter. Llechrydau (v c 50); near Heyop, Knucklas (v c 43). Formerly recorded from fields below Wenlock Edge and on Cound Moor.

GRASS FAMILY
GRAMINEAE

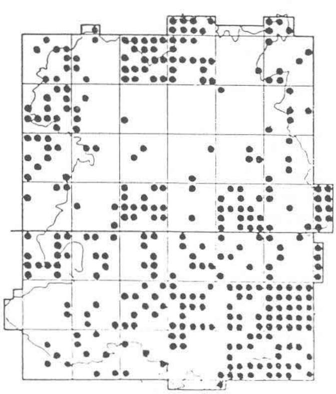
Meadow fescue
Festuca pratensis Hudson
Damp meadows, old lowland pastures, grazed fen and roadside verges, on moist to damp but winter-wet clay, loam or peat, PN med to rich, base rich, mod acid to calc, sun to ½ shade. Favoured by grazing or mowing, a characteristic member of the species-rich community of old meadows on fertile soils, but often included in seed mixtures. Ass: *Loliu per, Cynos cri, Briza med, Alope pra, Phleu pra, Desch cae, Ranun acr, Lotus uli.*
Locally frequent to abundant in pastoral lowland areas, more local in the uplands. V. unevenly recorded in present survey. Its natural distribution is somewhat uncertain.

Tall fescue
Festuca arundinacea Schreber



Pastures, meadows, roadside verges and waste ground, on moist to dry soils, PN rich, base rich, mod acid to calc, sunny, favoured by mowing and trampling, v. light grazing. Probably always a survivor from cultivation (formerly popular in some seed mixtures), but v. persistent in swards which are not too often mown. Ass: *Dacty glo, Arrhe ela, Cirsi arv, Artem vul, Sonch ole, Rumex obt.*
Locally frequent in parts of N Shropshire plain; Lower Severn Valley; and dales of Wenlock Edge area: rare in hill country.

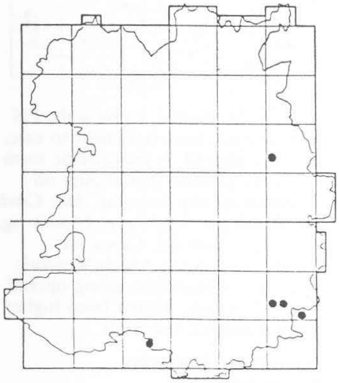
Giant fescue, Tall brome
Festuca gigantea (L.) Vill.



Woodland margins, rides and glades, wooded dingles, open scrub banks and verges, on damp sometimes summer-dry clay or loamy soils, PN med, base rich, mod acid to calc, ½ shade to

shade, little grazed. One of the most characteristic grasses of base-rich woodland on heavy soils. Ass: *Brach syl, Elymu can, Bromu ram, Carex syl, Carex str, Epilo mon, Sanic eur.*
Frequent in SE and NW of region and in the Ellesmere – Whitchurch area: local to sparse in more acid upland and NE plain.

Wood fescue
Festuca altissima All.



Wooded dingles and ravines, stream sides and banks in woodland or scrub, on wet to damp soils, often near rocks, PN med, base med to rich, mod acid to neut, ½ shade to shade, sheltered, ungrazed. Ass: *Alliu urs, Heder hel, Dryop fil, Phyll sco, Polys set, Mercu per.*
Rare and under-recorded: Borle Brook and tributaries near Highley and Billingsley; edges of Eymore Wood; and stream at Shatterford near Arley in v c 37 (all 1980–81 WAT); Downton Gorge v c 36 (1972 F Rose); also recorded from a flooded area in Donnington by colliery tip (1977 J Box). This plant is not mentioned in any of the earlier Floras, including *LRH*, but Carter (1955) quotes John Randall (1863) *Handbook to the Severn Valley Railway* p.47, ". . . whilst lily of the valley, giant bellflower, spreading bellflower, rare reed fescue grass and foxglove adorn the woods along the slopes". This presumably refers to *F. altissima*, as does a record in Purchas & Ley (1889) for *F. sylvatica:* "Downton Gorge on the right bank of the Teme 1869".

Red fescue
Festuca rubra L. agg.
Pastures, meadows, fens, lawns, greens, verges, quarries, sand pits, waste ground, on dry to moist soils, PN med to rich (rarely poor), base med to rich, acid to calc, sun to ½ shade. Tolerant of heavy grazing, mowing, tampling and disturbance, but capable of competing with taller grasses as well. Ass: *Loliu per, Cynos cri, Antho odo, Dacty glo, Trifo rep, Plant lan.*
A species of great genetical diversity including ecotypes adapted to extreme conditions such as toxic heavy metal mine spoil, sharply drained sandy or stony ground and the v. heavy pressure associated with recreational grassland. 'Chewings fescue' and other varieties are commonly included in fine grass seed mixtures.
Frequent to abundant throughout region except on the most acid soils.

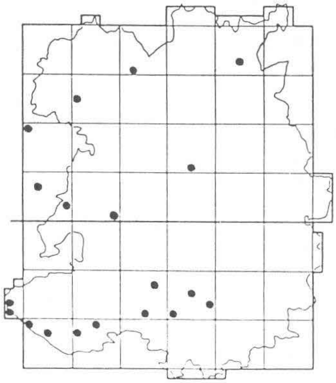
Sheep's-fescue
Festuca ovina L. agg.
Old pastures, rocky hillsides, banks and verges, lawns, quarries, sandpits, stone walls and tracks, on shallow sandy or stony soils, often with thick layer of raw humus, PN poor, base poor to rich, acid to calc, sunny, exposed. Favoured by heavy grazing and trampling but intolerant of compet with more vigorous grasses and quickly eliminated by use of fertilisers. Ass: *Agros cap, Antho odo, Luzul cam, Briza med, Desch fle, Poten ere, Viola riv, Lotus cor.*
Frequent to abundant in uplands esp in areas of hill farming: locally frequent to sparse in lowland and becoming rare in more intensively farmed areas. The members of this critical aggregate group have not been mapped in the present survey. There are records for **F. tenuifolia** Sibth. in open communities on rock ledges.
F. trachyphylla (Hackel) Krajina has also been reported.
F. lemanii Bast. has been reported from Wenlock Edge by Dr. M.E. Smith.

Perennial rye-grass
Lolium perenne L.
ssp. **perenne**
Permanent pastures, meadows, greens, playing fields, parks, verges, lawns and waste ground, on dry to moist but well drained soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. Favoured by grazing, mowing and trampling but persistent among taller grasses so long as a good nutrient supply is maintained. Ass: *Poa tri, Poa ann, Dacty glo, Phleu pra, Trifo rep, Ceras fon, Belli per, Tarax off.*
Probably the commonest and most widespread vascular plant species in the region, at least in terms of area covered. The dominant grass in agricultural seed mixtures for permanent pastures, becoming scarce only in the most impoverished upland sites.

Italian rye-grass
*ssp. **multiflorum** (Lam.) Husnot
The commonest component of seed mixtures for under-sowing or temporary leys, often persisting for a few years on field edges, gateways and roadsides, but not truly naturalised. Frequent throughout region.

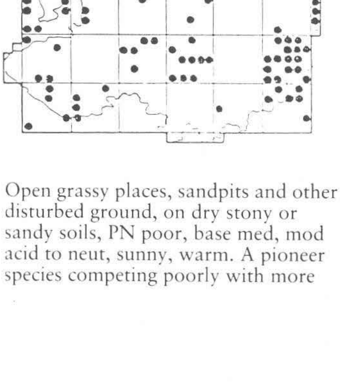
Darnel
†***Lolium temulentum** L.
Probably extinct.
A casual weed formerly associated with cornfields, rubbish tips and waste ground.
Recorded by Leighton for several localities in N Shropshire and near Ludlow, but not seen for many years.

× **Festulolium loliaceum** (Huds.) P. Fourn.
(*Festuca pratensis* × *Lolium perenne*)



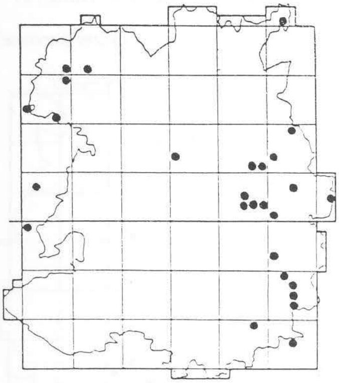
Wet meadows, pastures and grazed fen, on poorly drained, winter-wet soils, PN med to rich, base med to rich, mod acid to calc, sunny, sheltered, tolerant of grazing, trampling and mowing. This hybrid is locally frequent where the parents occur together.
It is commoner in the W, but no doubt under-recorded in the present survey. Recorded also in *CSABF* from SJ31, 40, 50, 60, SO38, 47, 67.

Squirreltail fescue, Barren fescue
Vulpia bromoides (L.) S.F. Gray



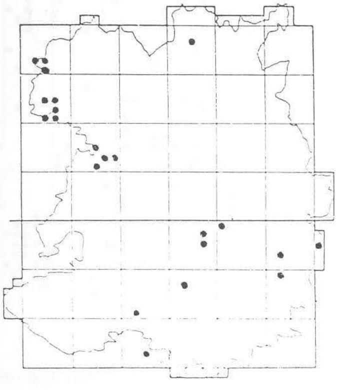
Open grassy places, sandpits and other disturbed ground, on dry stony or sandy soils, PN poor, base med, mod acid to neut, sunny, warm. A pioneer species competing poorly with more vigorous grasses and quickly eliminated by grazing. Ass: *Trifo dub, Arena ser, Aphan arv, Tripl ino, Papav dub.* Frequent in SE and mid W lowlands: locally frequent in Wenlock Edge and Clun Forest areas: sparse but probably under-recorded in NE.

Rat's-tail fescue
Vulpia myuros (L.) C.C. Gmelin



Ballast of old railway tracks, sidings, abandoned stations, arable fields, waste ground and spoil heaps, on dry often stony or sandy soils, PN poor, base rich, mod acid to calc, sunny, warm, intolerant of compet and of grazing. More strictly associated with railways and other man-made sites than *V. bromoides*. Ass: *Aira car, Aira pra, Arabi tha, Arena ser, Senec vis, Trifo arv.*
Locally frequent in SE from Wellington to Bewdley esp along Severn Valley Railway line: local in Oswestry area: with sparse records around Shrewsbury and Welshpool.

Fern-grass
Desmazeria rigida (L.) Tutin
(*Catapodium rigidum* (L.) C. E. Hubbard)

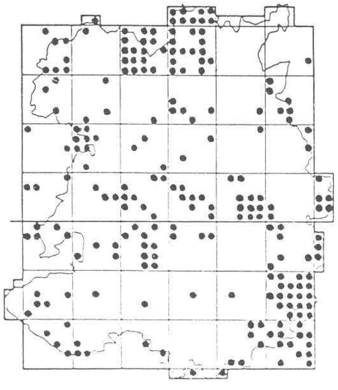


Limestone cliff tops, ledges, screes, quarry bottoms and bare patches in grassland, on shallow, dry stony soils, PN poor, base rich, neut to calc, sunny. Exposed, warm, a poor competitor often growing in bare soil or among patches of moss. Ass: *Saxif tri, Eroph ver, Aira car, Aphan arv, Veron arv, Erodi cic, Enca vulg, Funa mueh.*
V. locally frequent in Oswestry uplands; Alberbury area; Wenlock Edge: sparse elsewhere and confined to calcareous soils.

Annual meadow-grass, Annual poa
Poa annua L.

Gateways, cultivated fields, waste ground, rubbish tips, gardens, verges, bare patches in grassland, farmyards, tracks, ditch banks, on moist to dry, often compacted soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. Favoured by heavy trampling and manuring, typically a pioneer of open ground but quite tolerant of compet with taller grasses and persistent in closed communities. Ass: *Poa tri, Loliu per, Plant maj, Capse bur, Matri mat, Polyg avi.*
Widespread and abundant throughout region, except on most impoverished upland soils.

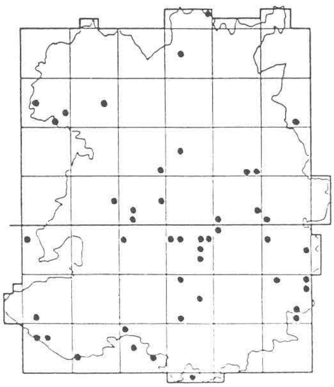
Wood meadow-grass, Wood poa
Poa nemoralis L.



Dry banks, woodland edges and rides, walls and rock outcrops, on dry freely drained loamy or stony soils, PN med, base med, acid to mod acid, sun to ½ shade, sheltered. Intolerant of grazing and of compet with more luxuriant grasses and therefore mainly confined to rather open communities. Ass: *Digit pur, Lapsa com, Glech hed, Heder hel, Geran rob, Polyp int.*
Frequent in Ellesmere – Whitchurch area; S and W edges of N Shropshire plain; and Lower Severn Valley: sparse elsewhere in lowlands and rare in higher hill country.

Flattened meadow-grass, Flattened poa
Poa compressa L.

Limestone quarry ledges, trampled areas on waste ground, spoil heaps and wall tops, on dry but often winter-wet and poorly drained, stony soils, PN poor to med, base rich, neut to calc, sunny, sheltered. A charactistic member of the pioneer community on limestone quarry bottoms. Ass: *Centa ery, Black per, Sagin ape, Desma rig, Erodi cic, Tussi far, Carex fla.*
Locally frequent in Much Wenlock area: sparse elsewhere along upland – lowland margin: absent from higher ground and NE lowlands.



Smooth meadow-grass
Poa pratensis L.

Pastures, meadows, verges, lawns, tracks, yards, old walls and derelict buildings, on dry to damp, often shallow or compacted soils, PN med to rich, base med to rich, acid to calc, sun to ½ shade. Tolerant of grazing, trampling and disturbance but also persisting in closed grassland vegetation. Ass: *Festu rub, Dacty glo, Poa ann, Tarax off.*
Frequent throughout region.
This species is extremely variable genetically and ecologically and is sometimes taken to include the two following species.

Narrow-leaved meadow-grass
Poa angustifolia L.

Grassy heaths, roadside banks, sandy or stony path edges, tops and bases of walls and sandstone bridge parapets, on dry to seasonally damp soils, PN poor to med, base poor to med, acid to neut, sun to ½ shade. Ass: *Festu rub, Poa pra, Lapsa com, Carex mur, Geran rob.*
V. under-recorded but perhaps quite frequent in lowland: distribution not adequately known.

Spreading meadow-grass
Poa subcaerulea Sm.

Hill pastures, heathland and grassy or rocky banks, roadsides, on shallow, dry, often stony soils, usu with a layer of raw humus, PN poor, base poor to med, acid to neut, sun to ½ shade. Tolerant of heavy grazing and trampling, though persisting in closed grassland. This species is particularly characteristic of heavily trampled pathways over hills where it is often

conspicuous by the way its leaves tend to be held close to the ground and at right-angles to the direction of the path. Ass: *Festu ovi, Agros cap, Antho odo, Galiu sax, Poten ere, Campa rot, Hiera pil.*
Frequent in uplands of S and W. Under-recorded and probably overlooked elsewhere.

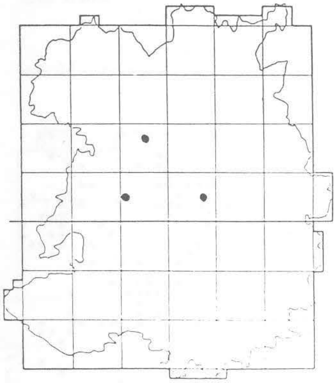
Rough meadow-grass
Poa trivialis L.

Pastures, meadows, verges, woods, waste ground, rubbish tips, farmyards gardens, ditch banks, pond sides, on damp to dry sometimes winter-wet soils, PN rich, base med to rich, mod acid to calc, sun to shade. Tolerant of heavy grazing and trampling but persisting in closed grassland communities, being tolerant of shade and producing much of its active growth at times of the year when other grasses are dormant. An indicator of high fertility. Ass: *Poa ann, Festu rub, Dacty glo, Glech hed, Urtic dio, Galiu apa, Ranun rep.*
Frequent to abundant throughout region except on most impoverished upland soils.

Swamp meadow-grass
***Poa palustris** L.

Recorded twice in the early 1960s by CAS and FHP: on wet ground in an old brick-pit between Halfway House and Westbury; and in fen carr on peat at The Yesters near Baschurch. The records are pre-1970, but there is no reason to believe the species is extinct.

Broad-leaved meadow-grass
***Poa chaixii** Vill.



A well established alien grass sown during the 19th century in game coverts, spreading and persisting locally. Pontesford Hill plantation (part of Earl's Hill Nature Reserve); Mytton Hall 'Nuttery' beside road; Cound Hall near lake.

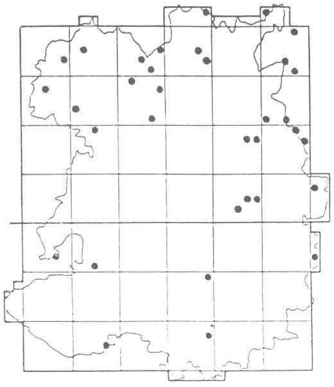
Cock's-foot
Dactylis glomerata L.

Grassland, verges, edges of woods, rides and glades, open scrub, waste ground, old building sites, on damp to dry soils, PN med to rich, base med to rich, acid to calc, sun to shade. Tolerant of trampling, light grazing and occasional mowing but slowly eliminated when cut or nibbled too close to ground level, a vigorous competitor with other grasses, often becoming dominant and tussocky in paddocks, orchards and other places where former heavy grazing has been relaxed. Extremely variable genetically and ecologically. Ass: *Poa tri, Alope pra, Phleu pra, Elymu rep, Urtic dio, Rumex obt, Ranun rep.*
Frequent to abundant throughout region except at highest altitudes.

Crested dog's-tail
Cynosurus cristatus L.

Old pastures, meadows, grazed fen, verges, lawns and trampled waste ground, on moist to dry, often winter wet and poorly drained soils, PN poor to rich, base med to rich, acid to calc, sunny. Tolerant of v. heavy grazing and trampling or frequent mowing, but persisting in compet with other mod sized grasses. A characteristic species of old grassland communities, less commonly included in seed mixtures than formerly. Ass: *Loliu per, Festu pra, Festu rub, Antho odo, Ranun acr, Belli per, Carda pra.*
Frequent throughout region.

Whorl-grass
Catabrosa aquatica (L.) Beauv.

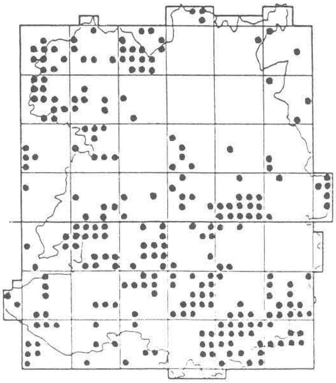


Ditches, sluggish rivers, canal sides and pond margins, on wet mud or in shallow water, PN med to rich, base rich, neut to alk, sunny. Tolerant of trampling and light grazing, a pioneer species and poor competitor with taller grasses, often spreading extensively by runners and forming floating mats on sheltered waters. Ass: *Agros sto, Glyce flu, Veron bec, Juncu art, Ranun fla, Menth aqu.*
Local but perhaps overlooked in N and E parts of Shropshire plain: rare in S of region.

Loose silky-bent
***Apera spica-venti** (L.) Beauv.

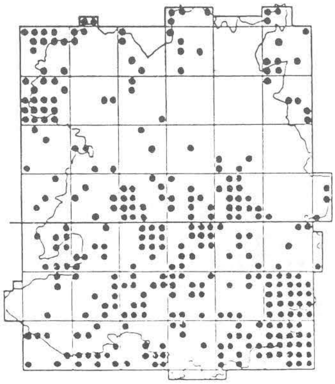
One or two plants on verge of A5 near Gobowen by roundabout where earth had been disturbed for pipe-laying in 1978 (1983 BD). Formerly recorded as a casual on waste ground at Buildwas; and at Oakly Park.

Quaking-grass
'Cow-quakers', 'Quakers'
Briza media L.



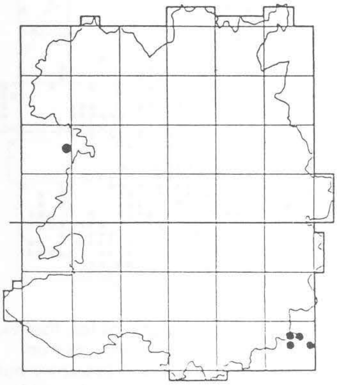
Pastures, meadows, grazed fen, flushes, rocky slopes, quarry floors, usu on shallow, stony soils over limestone but also on calcareous peat or clay with impeded drainage, dry or winter-wet, PN poor to med, base rich, mod acid to calc, sunny, warm. Tolerant of heavy grazing and trampling but persisting in meadows mown annually, typical of old species-rich grasslands. Ass: grassland – *Linum cat, Primu ver, Sangu min, Carex fla, Carex car;* flushes – *Trigl pal, Carex pcea, Valer dio, Lotus uli, Festu pra.*
Frequent in hill country of W and S except on the most acid rocks: locally frequent in Ellesmere area and NW and SE parts of plains: absent from intensive arable E.

Wood melick
Melica uniflora Retz.



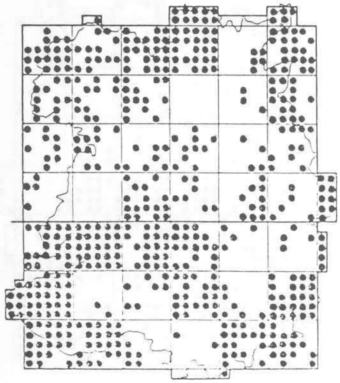
Edges, rides and clearings of old deciduous woodland, open scrub and hedgebanks, often associated with rock outcrops, on dry to damp but well drained soils, PN med, base med to rich, mod acid to calc, ½ shade to shade, warm, sheltered, ungrazed. Ass: *Mycel mur, Geran rob, Sanic eur, Brach syl, Solid vir.*
Frequent in NW and SE corner of region: locally frequent in hill country elsewhere: sparse on plain and absent from parts of NE.

Mountain melick
Melica nutans L.

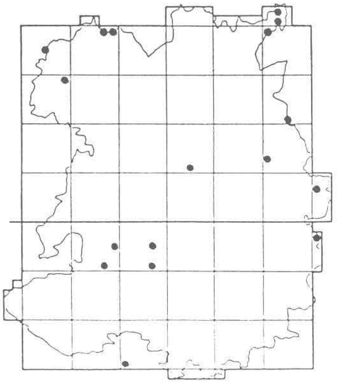


Steep wooded dingles and rocky banks above streams, shady ditches and track sides, usu damp but well drained, on stony or sandy to loamy soils, PN poor, base med to rich, acid to neut, ½ shade to shade, ungrazed. Ass: *Carex mon, Eupho amy, Hyper pul, Lathy mon, Solid vir.*
Rare: Wyre Forest; some records on N side of Dowles Brook, but more in v c 37. Also reported from Llandysilio in 1956 by VJM and from Craig Breidden (1977 Hignett and Lacey): the same record?

Floating sweet-grass, Flote-grass
Glyceria fluitans (L.) R.Br.

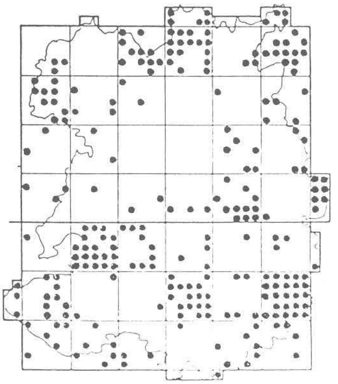


Ditches, lowland streams, sluggish rivers, sides of ponds and canals, hollows in fields, on poorly drained clay or peat soils or on bare mud or floating on shallow water, PN med to rich, base med to rich, mod acid to calc, sunny. Tolerant of grazing and trampling except in wettest habitats, a vigorous competitor. Ass: *Agros sto, Alope gen, Juncu art, Veron bec, Menth aqu, Sparg eme, Ranun aqu.*
Frequent throughout region but unevenly recorded in present survey.



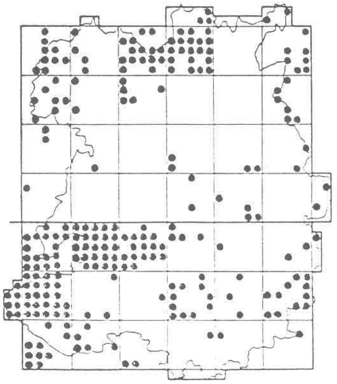
G. × pedicillata Townsend.
This hybrid with *G. plicata*, has been recorded from scattered localities in most parts of the region.

Plicate sweet-grass
Glyceria plicata Fries



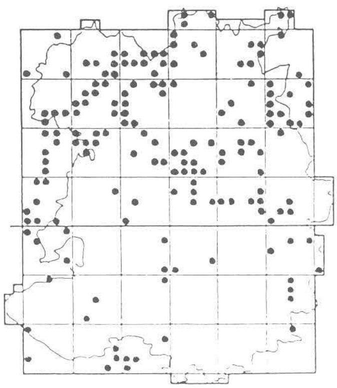
Shallow, overgrown farm ponds and marl-pits, neglected ditches, floodswards along margins of slow streams, usu rooted under water in mud or clay, rarely summer-dry, PN rich, base rich, neut to alk, calc, sunny, warm, sheltered. Fairly tolerant of trampling and grazing, a strongly competitive creeping pioneer in shallow nutrient-rich waters. Ass: *Agros sto, Alope gen, Glyce flu, Juncu inf, Nastu off, Ranun rep, Veron bec.*
Frequent to abundant throughout region but very unevenly recorded.

Small sweet-grass
Glyceria declinata Bréb.



Marshy hollows in grassland or heath, rutted tracks, poached margins of ponds, ditches, drains, springs and runnels by forest rides, on moist, intermittently flooded or seasonally wet sandy or loamy soils or peat or mud, PN med, base med, acid to neut, ½ shade to sun (upland), cool, sheltered. V. tolerant of trampling, mod resistant to grazing, manuring and compet, a creeping-pioneer of bare wet patches on poor soils. Ass: *Agros can, Agros sto, Carex dem, Carex pcea, Isole set, Juncu art, Juncu buf, Juncu ten, Lotus uli, Ranun fla, Ranun rep, Stell als.*
Frequent in West Central hills; Clun Forest; and other wet upland areas: locally frequent on farmland in meres and mosses district and Lower Severn Valley: rather sparse elsewhere and rare in arable lowlands.

Reed sweet-grass
Glyceria maxima (Hartman) Holmberg

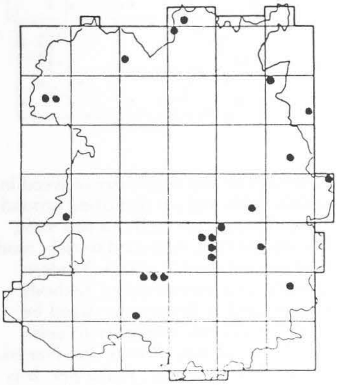


Disused canals, rivers, streams and ditches, usu in slow flowing or standing water at 0.5m depth, on clay or mud, PN rich, base rich, neut to calc, sun to ½ shade, sheltered and warm.

Intolerant of grazing or frequent mowing but when undisturbed and well supplied with nutrients forms vigorous and extensive pure stands which may grow up to 3m tall in sheltered places. Rhizomes forming a floating mat which occasionally becomes detached and transported to new localities down stream. Ass: *Rumex hyd, Sparg ere, Epilo hir, Typha lat, Oenan cro, Solan dul.*
Frequent in suitable habitats through out lowland; rare in uplands.

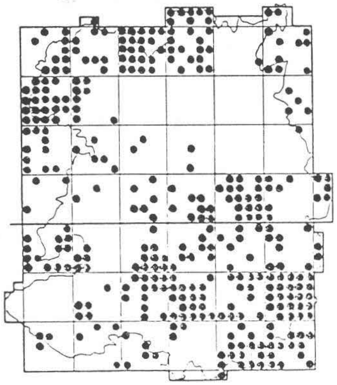
Barren brome
Bromus sterilis L.
(*Anisantha sterilis* (L.) Nevski)
Disturbed ground on roadside verges, hedgebanks, edges of ploughed fields, farmyards, rubbish tips, waste ground, sides of suburban pavements, on dry well drained soils, PN rich, base med to rich, mod acid to calc, sunny, warm, ungrazed. A pioneer annual, competing strongly with tall perennial grasses in favourable situations. Characteristic of the community associated with warm sites near human habitations where the soil is enriched by the activities of domestic animals. Ass: *Horde mur, Poa ann, Ballo nig, Urtic dio, Lamiu alb.*
Frequent in lowland: local to sparse in hill country where it is mainly confined to the valleys.
Now a serious arable weed.

Upright brome
Bromus erectus Hudson
(*Zerna erecta* (Hudson) S.F. Gray)



Limestone grassland, quarries and roadside banks, on dry shallow, stony soils, PN poor, base rich, calc, sunny. A vigorous and aggressive grass esp when ungrazed. Ass: *Briza med, Brach syl, Carex fla, Centa sca, Scabi col, Sangu min.*
V. locally frequent in Wenlock Edge area: scattered records elsewhere in SE; and on limestone near Nantmawr. Doubtful records elsewhere in N and SW have not been mapped.

Hairy-brome
Bromus ramosus Hudson
(*Zerna ramosa* (Hudson) Lindman)



Woodland clearings, rides and edges, open scrub and hedgebanks, on damp but well drained, often loamy soils, PN poor to med, base med to rich, mod acid to calc, shade to ½ shade, sheltered. Intolerant of compet or grazing. Ass: *Festu gig, Elymu can, Carex syl, Sanic eur, Circa lut.*
Locally frequent in NW and SE of region: sparse elsewhere and absent from parts of hill country on acid rocks and from NE arable lowlands.

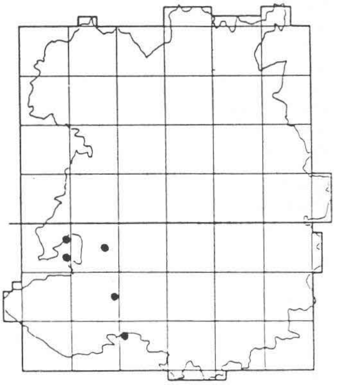
Lesser hairy-brome
Bromus benekenii (Lange) Trimen
(*Zerna benekenii* (Lange) Lindman)
A tentative record for Harton Hollow Wood (1963 CAS) has not been confirmed, but *ABF* shows this species in SO47 and 48, SJ51.

Soft-brome, Lop-grass
Bromus hordeaceus L. ssp **hordeaceus**
(*Bromus mollis* L.)
Pastures, meadows, roadside verges esp where the ground is occasionally disturbed and on wasteland and rubbish tips, on dry to damp but well drained soils, PN med to rich, base med to rich, mod acid to calc, sunny. Tolerant of grazing, mowing and trampling, particularly favoured by hay meadow management. Ass: *Antho odo, Alope pra, Phleu pra, Festu pra, Loliu per, Ranun acr, Rumex aosa.*
Frequent throughout region.
B. × pseudothominii P.M.Sm. (*B. thominii* auct.), the hybrid with *B. lepidus*, was recorded in the Attingham Park Flora survey (both tetrads); it is shown in *ABF* for SO48, SJ22,41,72.

Slender soft-brome
Bromus lepidus Holmberg
Scattered records in Whitchurch area and near the county boundary in S of region are not sufficiently reliable to indicate the distribution of this species, which was once commonly sown. *ABF* has it in SO47, 48, 49, SJ41, 62, 63, 72, 73, 74.

Smooth brome
†**Bromus racemosus** L.
Extinct?
Reported from a pasture near Morton Pool in 1981 (NCC Grassland Survey) but unconfirmed. Earlier records in *HFS* from pastures at Hadnall; Benthall Edge; and Coalbrookdale.

Meadow brome
Bromus commutatus Schrader



Old meadows and roadside verges in SW of region.
Rare: near Hopesay (1977 TEM); near Wentor (1978 JAW); near Clungunford (1979 TEM); banks of Camlad near Church Stoke (1978 TEM); near Priestweston (1982 JMR). Also in v c 47 in 1940 in a field near Guilsfield (JA Webb, MS *Flora of Monts.*).

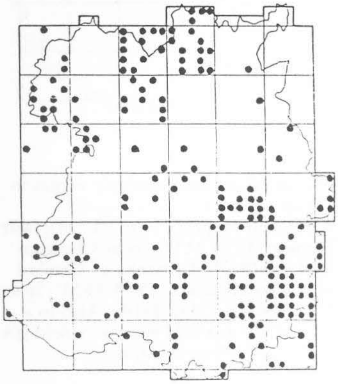
Rye brome
†**Bromus secalinus** L.
Extinct?
A casual species formerly recorded from cultivated fields near Stanwardine; Sharpstones; Hadnall; Berrington; Wenlock Edge; and Oakly Park.

California brome, Keeled brome
***Bromus carinatus** Hooker & Arnott
Recorded as a casual in a hedgerow on the NE side of A5 in Whittington; and also at Chirk (1979 BD).

False brome
Brachypodium sylvaticum (Hudson) Beauv.
Open scrub and woodland, rocky banks, rough grassland, roadside verges, limestone quarries and spoil heaps, on dry often shallow stony loam or clay soils, well drained, PN poor to med, base med to rich, mod acid to calc, sun to shade. Intolerant of heavy grazing or mowing but often dominant when undisturbed. Ass: *Elymu can, Melic uni, Fraga ves, Clino vul, Viola hir, Primu vul, Anemo nem.*
Frequent in suitable habitats throughout region.

Tor-grass, Heath false-brome
Brachypodium pinnatum (L.) Beauv.
Recorded on a roadside bank at Lightmoor in 1983 by AG Blunt.
Also recorded for SJ72 (*ABF*).
A curious feature of the limestone grasslands in this region is the rarity or absence of most of the characteristic species of calcicolous grasses found in similar habitats elsewhere in the British Isles. *Bromus erectus* is on the edge of its range, becoming very rare in the Oswestry Uplands; *Brachypodium pinnatum* only occurs as a casual here; *Sesleria albicans* has its main area of distribution well to the N. The most surprising gaps, however, are those in the ranges of *Avenula pratensis* and *Koeleria macrantha,* neither of which should be climatically excluded (see also Chapter 6).

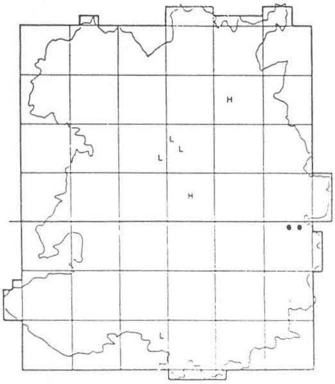
Bearded couch
Elymus caninus (L.) L.
(*Agropyron caninum* (L.) Beauv.)



Edges, rides and clearings in woods, open scrub, hedgebanks and steep river banks, on dry to damp but well drained soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, warm, sheltered. Intolerant of grazing. Ass: *Festu gig, Carex syl, Bromu ram, Ajuga rep, Brach syl.* Locally frequent in NW and SE of region, scattered elsewhere: rare in W Central hills; Clun Forest; and arable NE.

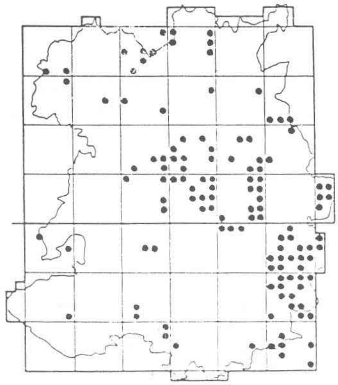
Common couch, Scutch, Twitch
Elymus repens (L.) Gould
(*Agropyron repens* (L.) Beauv.)
Cultivated land, gardens, hedgebanks, verges, farmyards, track sides, rubbish tips, waste ground, on dry to damp, well drained soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. Intolerant of grazing but an almost ineradicable pioneer weed of turned soil which ploughing and cultivation only serves to propagate by small fragments of rhizome. Ass: *Cirsi arv, Urtic dio, Aegop pod, Arrhe ela, Galiu apa.*
Widespread and frequent on fertile ground throughout region except at highest altitudes.
The var **aristatus** has been recorded in a number of places.

Meadow barley
Hordeum secalinum Schreber



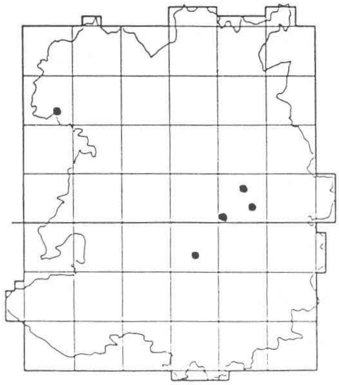
Reported recently from rough pastrues, near Stableford (1978 WEH). Old records as a grassland weed in Shrewsbury area and near Ludlow.

Wall barley
Hordeum murinum L.

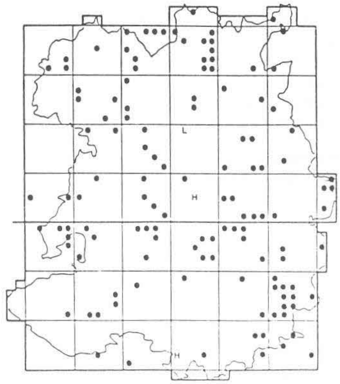


By walls and footpaths and on waste ground esp in towns, on dry stony or rubbly soil, PN rich, base rich, neut to calc, sunny, warm, sheltered, usu ungrazed but v. tolerant of trampling and disturbance. Characteristic of warm sites where the soil is enriched by the urine and excrement of dogs. Ass: *Ballo nig, Lamiu alb, Urtic dio, Loliu per, Bromu ste.*
The map shows a clear distribution of a thermophilous species: frequent in S and E parts of the N Shropshire plain and in the Lower Severn Valley: local elsewhere and absent from much of the hill country.

Wood barley
Hordelymus europeaeus (L.) Harz
Steep ancient woodlands, on limestone or calcareous shale, on dry to damp but well drained, stony clay soils, PN med, base rich, neut to calc, ½ shade to shade, sheltered, ungrazed. Ass: *Carex syl, Festu gig, Bromu ram, Sanic eur, Mercu per.*
Local: Wenlock Edge; Benthall Edge; Lydebrook Dingle; Llanymynech Hill.



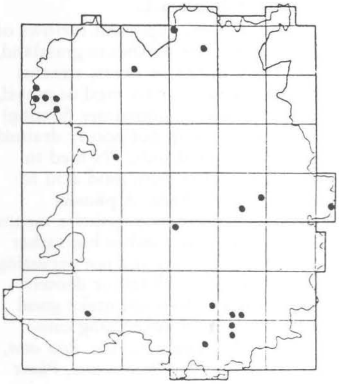
Wild-oat
***Avena fatua** L.



A persistent and troublesome weed in arable fields and on disturbed ground around farms, on well drained soils, PN med to rich, base med to rich, mod acid to calc, sunny, warm. Modern farming and seed-cleaning methods have tended to favour this weed because of its close similarity to cultivated cereals. Ass: *Bromu ste, Poa tri, Papav rho, Matri rec, Polyg per.* It is now widely distributed throughout the lowland and sparsely in the hill country. The first record was in 1841 near Astley and there were only three additional records in *HFS.*

Meadow oat-grass
†**Avenula pratensis** (L.) Dumort.
(*Helictotrichon pratense* (L.) Besser.)
Probably extinct.
Two recent unconfirmed records in the Bridgnorth area; and a record from Llanymynech Hill (v c 47?), by Cambridge University Botanical Expedition in 1955.

Downy oat-grass, Hairy oat
Avenula pubescens (Hudson) Dumort.
(Helictotrichon pubescens (Hudson) Besser)



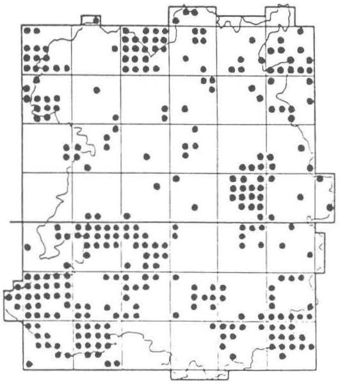
Old, species-rich meadows and pastures on limestone or calc clays, on heavy damp to dry soils, PN med, base rich, neut to calc, sunny. Tolerant of mowing and grazing but not of fertilisers nor compet with the most vigorous fodder-grasses. Ass: *Briza med, Cynos cri, Dacty glo, Trise fla, Centa nig, Lotus cor, Pimpi sax, Primu ver, Ranun bul.*
V. locally frequent in limestone areas near Oreton and Porth y Waen: v. sparse elsewhere. Perhaps overlooked.

False oat-grass
Arrhenatherum elatius (L.) Beauv. ex J. & C. Presl
Verges and hedgebanks, hay meadows, open scrub and woodland edges, railway embankments, edges of fields, waste ground, on dry to damp but well drained soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Tolerant of mowing but not of heavy grazing, a vigorous competitor with other tall plants, favoured by occasional fires. Ass: *Chame ang, Pteri aqu, Holcu lan, Dacty glo, Elymu rep, Alope pra, Anthr syl.*
Frequent to abundant throughout region except at highest altitudes.
Var **bulbosum** (Willd.) Spenner is common generally, and may be more fire-resistant than the type.

Yellow oat-grass
Trisetum flavescens (L.) Beauv.
Meadows, pastures, verges, hedgebanks and open scrub, on dry to damp but well drained soils, PN poor to med, base rich, mod acid to calc, sunny. Tolerant of grazing, but most abundant in old species-rich hay fields on calcareous soils. Ass: *Festu pra, Festu rub, Briza med, Bromu hor, Pimpi sax, Hyper hir.*
Frequent in suitable habitats throughout region.

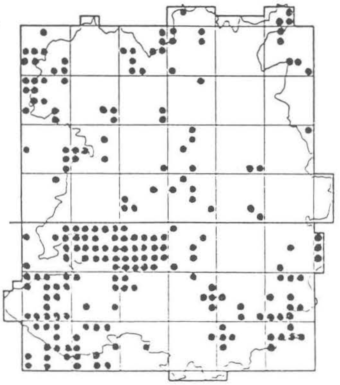
Tufted hair-grass
Deschampsia cespitosa (L.) Beauv.
'Bulls' pates', 'Sniggle-bogs', 'Snizzle - grass', 'Iron-grass'
Wooded dingles, flushes, stream sides, ditches, fens, hollows in fields, rough pasture, on moist to damp poorly drained soils with high winter water-table and some lateral seepage of water in soil, usu on clay or peat, PN poor to med, base med to rich, acid to calc, sun to shade. Resistant to grazing by virtue of its very rough leaves, tending to form tussocks in pasture, which can, however, be broken up by heavy trampling and grazing. Ass: *Cynos cri, Antho odo, Holcu lan, Juncu inf, Lotus uli, Carex syl.*
Frequent throughout region.

Wavy hair-grass
Deschampsia flexuosa (L.) Trin.



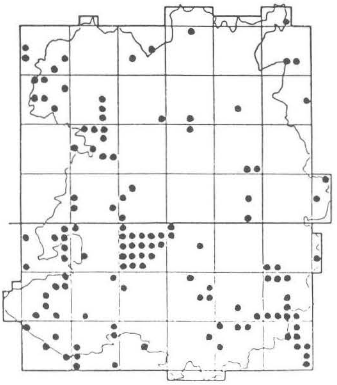
Poor grassland, heath, moorland, open woods esp of birch or oak, sandy or rock banks and drained peat mosses, on dry to damp soils, PN poor, base poor, very acid to acid, sun to shade. Tolerant of grazing though often ungrazed, in woods will flourish in combination of shade, dryness and acidity which few other species can withstand. Ass: *Vacci myr, Luzul syl, Blech spi, Callu vul, Rumex alla, Festu ovi, Dicr scop, Leuc glau.*
Frequent in suitable habitats throughout region.
An old record for *D.setacea* at Ellesmere is dubious: a specimen in **SHY** labelled "*D.uliginosa*" is in fact *D.flexuosa.*

Early hair-grass
Aira praecox L.
Open spring-annual communities esp on bare patches in grassland, on rocky slopes, banks and sandy fields, on dry shallow, often stony soils, PN poor, base poor to med, mod acid, sunny, warm, exposed. Tolerant of light grazing, a pioneer colonist of disturbed ground (eg by rabbits) but a poor competitor with tall perennials. Ass: *Rumex alla, Festu ovi, Teesd nud, Jasio mon, Hiera pil.*



Frequent in Oswestry uplands; W Central hills; Clun Forest; locally frequent elsewhere but rare on limestone and in NE lowlands.

Silver hair-grass
Aira caryophyllea L.



Open communities and bare patches in grassland, heathland and on rocky slopes, esp limestone, rock ledges and walls, on dry, well drained shallow soils, PN poor, base med to rich, mod acid to calc, sunny, warm, exposed. Ass: *Rumex alla, Festu ovi, Teesd nud, Jasio mon, Hiera pil.* Locally frequent in Oswestry uplands; Long Mynd area; and Lower Severn Valley; scattered elsewhere and rare in NE lowland.

Sweet vernal-grass
Anthoxanthum odoratum L.
Pastures, meadows, moorland, fens, lawns, hedgebanks, on moist to dry but often poorly drained soils, PN poor to med, base poor to rich, acid to calc, sun to ½ shade. Tolerant of grazing, mowing and trampling but persisting in compet with med-sized grasses in hay meadows. Characteristic of old species-rich grassland on rather nutrient-poor sites. Ass: *Holcu lan, Festu rub, Festu ovi, Agros cap, Poten ere, Prune vul, Plant lan, Ranun acr.*
Frequent to abundant throughout, probably commonest in hill country.

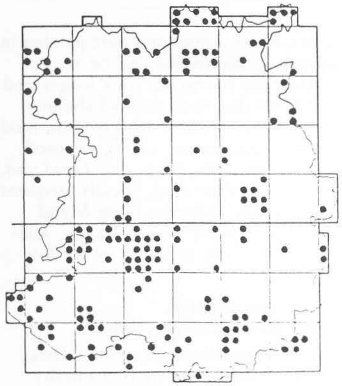
Yorkshire-fog
Holcus lanatus L.

Grassland, hedgebanks, moorland, fens, mires, flushes, wet hollows in fields, on moist to dry, often poorly drained and winter-wet soils, PN poor to med, base poor to rich, acid to calc, sun to ½ shade. Tolerant of grazing, mowing and trampling but a strong competitor with all but most vigorous grasses. Also tolerant of disturbance and sometimes dominating areas of ground ploughed or drained a few years previously. Favoured by pockets of slightly deeper soil on hillsides where it sometimes hangs like patches of mist in hollows, hence its name. Ass: *Festu ovi, Festu rub, Agros cap, Antho odo, Desch cae, Rumex aosa, Plant lan, Ranun acr, Viola riv.*
Frequent to abundant throughout, probably commonest in hill country.

Creeping soft-grass
Holcus mollis L.

Woodland, scrub, hedgebanks, old pastures, edges of moorland, drained peat-mosses, on dry to damp but well drained soils, PN poor to med, base poor to med, acid to mod acid, ½ shade to shade (full sun in uplands only). Tolerant of occasional mowing or light grazing but a poor competitor under conditions which favour growth of more vigorous grasses. Ass: *Hyaci non, Stell hol, Silen dio, Oxali ace, Luzul pil, Desch fle, Poa nem, Pteri aqu.*
Frequent in suitable habitats throughout region.

Velvet bent
Agrostis canina L.



Fens, old pastures, meadows, wet hollows in fields and pond margins, on moist to damp, intermittently flooded peat or humus-rich clay, PN poor, base poor to med, acid to neut, sun to ½ shade. Seldom grazed, tolerant of trampling and of compet with med-sized grasses. Ass: *Juncu eff, Juncu acu, Luzul mul, Carex hir, Carex nig, Poten pal, Epilo pal, Galiu pal.*
Locally frequent in suitable habitats mainly in lowlands. Less common in upland than the following species which was not separated for mapping in the present survey.

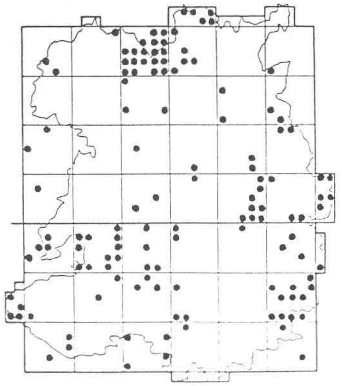
Brown bent
Agrostis vinealis Schreber
(A. canina ssp. *montana* (Hartman) Hartman)

Poor pastures, moorland and heath, on dry or seasonally damp, often shallow stony or sandy soils, PN poor, base poor, acid to mod acid, sunny, exposed. Tolerant of heavy grazing and trampling but not compet with tall grasses. A typical member of the transitional community between hill pasture and heather moor. Ass: *Galiu sax, Luzul cam, Agros cap, Desch fle, Ulex gal, Callu vul, Nardu str.*
Locally frequent in uplands: rare in lowland. Not separated from *A.canina* in the present survey.

Common bent
Agrostis capillaris L.
(A.tenuis Sibth.)

Grassland, hedgebanks, fens, moorland, lawns, edges of woodlands and open scrub, on moist to dry soils, PN poor to med, base poor to rich, acid to neut, sun to shade. V. tolerant of grazing, mowing and trampling but not of compet with tall vigorous grasses. Probably the commonest grass in old unploughed pastures and one of the commonest in lawns unless they are regularly fed with fertiliser. Ass: *Festu rub, Festu ovi, Antho odo, Holcu lan, Plant lan, Hypoc rad, Campa rot.*
Abundant throughout region.

Black bent
Agrostis gigantea Roth



Edges of arable fields, roadside verges, gateways, farmyards, gardens, rubbish tips and other disturbed ground, on damp to dry, often heavy soils, PN rich, base med to rich, mod acid to calc, sun to ½ shade. A pioneer and often a troublesome weed, intolerant of grazing and heavy mowing. Ass: *Elymu rep, Rumex cri, Matri rec, Polyg per, Agros sto.*
Locally frequent esp in lowlands but under-recorded and probably still on the increase.
Not mentioned in *LFS* or *HFS.*

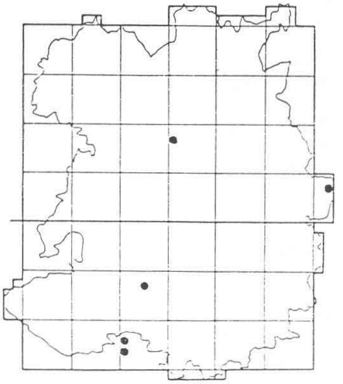
Creeping bent, Fiorin
Agrostis stolonifera L.

Roadside verges, edges and furrows of arable fields, bare patches in grassland, pond sides, banks of rivers, streams and ditches esp on bare mud or gravel, in shallow water (sometimes floating) or on wet to damp but poorly drained or winter-flooded soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. A pioneer spreading rapidly by vegetative means to form extensive patches but rather intolerant of grazing and not persisting long in compet with tall or densely tufted grasses. Does not make good lawns, in spite of advertising campaigns to the contrary. Ass: *Poa ann, Poa tri, Alope gen, Poten ans, Plant maj, Juncu eff, Ranun sce.*
Abundant in suitable habitats throughout region.

Wood small-reed
Calamagrostis epigejos (L.) Roth

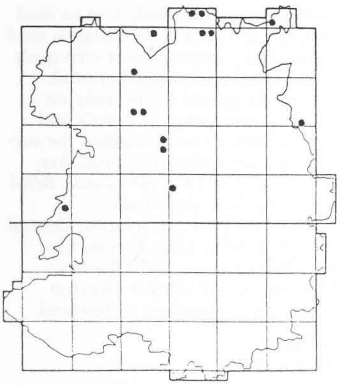
Shaded sides of streams and ponds, waste ground, old railway tracks and roadsides, on moist to damp soils, PN med to rich, base med to rich, ½ shade to shade, ungrazed but occasionally mown.

Rare: near Marshbrook; Spring Coppice, Boscobel; roadside near Leintwardine. Seen by Leighton in claypits behind Battlefield church, still there in 1965 (CAS). Also recorded in 1940 from v c 47 in a "rough corner of a cornfield almost immediately opposite Forden Station" (JAWebb, MS *Flora of Monts.).*



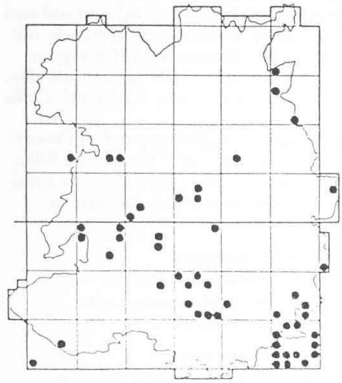
Purple small-reed
Calamagrostis canescens (Weber) Roth

On or among sedge-tussocks in tall fen or carr, on moist but not permanently inundated peat, PN med to rich, base



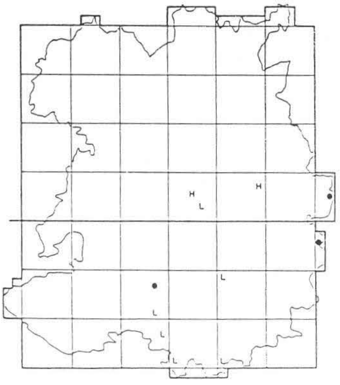
med to rich, mod acid to calc, sun to ½ shade, sheltered, ungrazed, perhaps most characteristic of open areas in alder carr. Ass: *Carex pata, Carex amis, Angel syl, Ranun lin, Cicut vir.*
V. locally frequent around meres in Whitchurch - Ellesmere - Shrewsbury areas; Marton Pool, Chirbury; in Old River Bed N of Shrewsbury; and in v c 39 at Aqualate.

Timothy, Cat's-tail
Phleum pratense L. ssp **pratense**
Grassland, hedgebanks and verges, waste ground, edges of fields, on damp to dry soils, PN rich, base med to rich, mod acid to calc, sunny. Tolerant of grazing, mowing and a strong competitor. A common component of seed mixtures for hay meadows or permanent pasture. Ass: *Loliu per, Cynos cri, Trifo rep, Ranun acr, Tarax off, Plant lan.*
Frequent throughout lowlands, less so in hill country.



Smaller cat's-tail
ssp **bertolonii** (DC.) Serb. & E.I. Nyárády is common in the uplands but its distribution and ecology not reliably separated from the type. Ass: *Agros cap, Bromu hor, Cynos cri, Holcu lan, Centa nig, Crepi cap, Hypoc rad.*

Black-grass
Alopecurus myosuroides Hudson

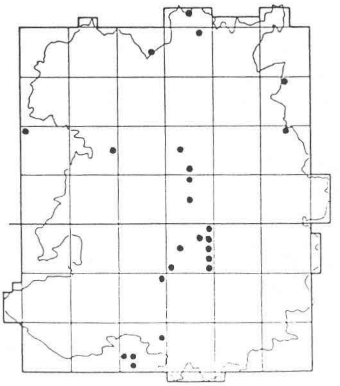


Verges, disturbed ground, arable fields and gardens, on dry, sandy soils, PN rich, base med, neut, sunny.
Rare: Alcaston; Shipley; and Harriot's Hayes near Albrighton. Formerly recorded as a casual from several other places in S and E but never common.

Meadow foxtail
Alopecurus pratensis L.
Grasslands, hedgebanks, roadside verges, edges of woodland and open scrub, wild gardens and waste ground, on damp to dry soils, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade. Tolerant of grazing and mowing but a strong competitor and one of the commonest lowland grasses. Ass: *Elymu rep, Arrhe ela, Phleu pra, Loliu per, Urtic dio, Anthr syl, Trifo rep.*
Frequent throughout lowland, less so in uplands.

Marsh foxtail
Alopecurus geniculatus L.
Banks of ditches, ponds and streams, wet hollows in fields, flushes in hill grassland, on wet to damp, poorly drained, usu clay soils, PN med to rich, base med to rich, mod acid to calc, sunny, tolerant of grazing and trampling. A pioneer on mud in dried up ponds but seldom persisting in compet with more luxuriant grasses except in flooded areas. Ass: *Agros sto, Glyce flu, Carex hir, Juncu eff, Juncu inf, Ranun rep, Lychn flo.*
Locally frequent throughout region but mainly lowland.

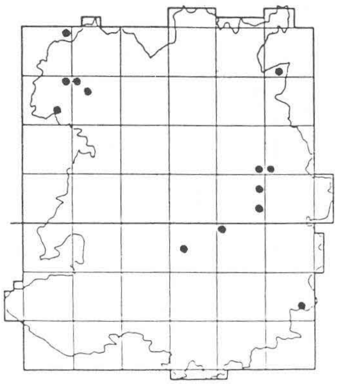
Orange foxtail
Alopecurus aequalis Sobol.
Edges of ponds, pools, ditches, slow rivers, in damp winter-flooded hollows in fields, on poorly drained, often clay soils, PN med, base med, mod acid to neut, sunny. A vigorous pioneer species on areas of intermittent flooding and very high winter water-table. Ass: *Agros sto, Polyg hyd, Plant maj, Poten ans, Polyg amp, Eleoc pal.*



Locally frequent around Wenlock; Shrewsbury; and Leintwardine. Apparently rare elsewhere but possibly overlooked.

Reed canary-grass
Phalaris arundinacea L.
Ditches, sides and banks of rivers, streams, ponds, disused canals and occasionally in hedges, on water-logged ground, in shallow still or slow flowing water or on mud or poorly drained clay soils or peat, often flooded in winter, PN med to rich, base med to rich, mod acid to calc, sun to ½ shade, ungrazed, tolerant of occasional mowing. A strong competitor, at its best in winter-flood zone of rivers. Ass: *Glyce max, Epilo hir, Oenan cro, Lythr sal, Rumex obt, Urtic dio, Artem vul.*
Frequent in suitable habitats esp in lowland.

Canary-grass
***Phalaris canariensis** L.

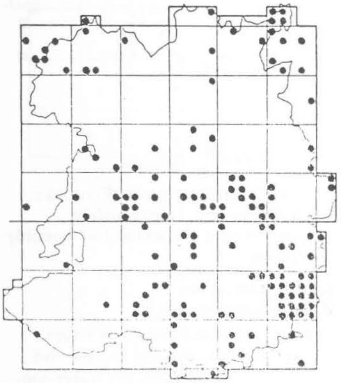


Rubbish tips, waste ground, disturbed roadsides, farmyards and gardens, always a casual from dumped seed (eg pheasant food), sometimes persisting for several years.
Locally frequent in Oswestry and Telford areas: a few records elsewhere in lowland parts of region.

Lesser canary-grass
***Phalaris minor** Retz.

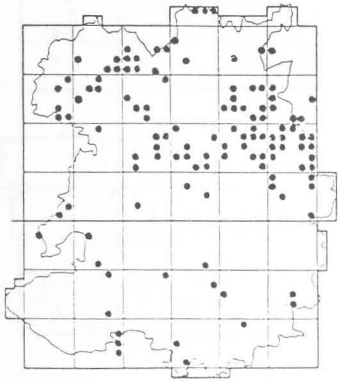
Casual. Cardeston Quarry (1961 EMR), incorrectly recorded as *P. paradoxa* (specimen in SHY).

Wood millet
Milium effusum L.



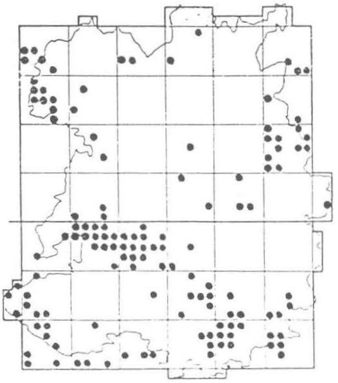
Old mixed deciduous woodland, on damp poorly drained, often winter-wet clay or loam soils, PN med, base med, mod acid to neut, ½ shade to shade, ungrazed. Ass: *Carex syl, Mercu per, Geum urb, Geran rob, Ajuga rep, Veron mon.*
Frequent in Lower Severn Valley: locally frequent elsewhere in SE and centre of region and in extreme NW and NE: generally sparse to rare in lowlands and in Clun Forest area.

Common reed
Phragmites australis (Cav.) Trin. ex Steudel
(P.communis Trin.)



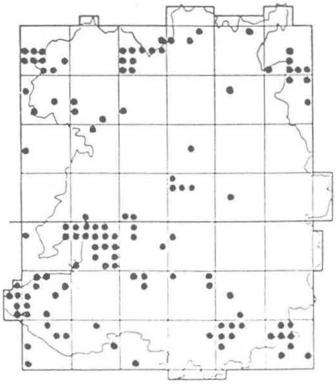
Margins of meres, pools, canals, slow rivers, in water up to 1.5m depth, rooted in peat or clay, PN med to rich, base med to rich, neut to alk, sunny, sheltered, intolerant of grazing or shade. Often forming extensive pure stands as reedswamp but persisting into later stages of succession among sedge-tussocks or willow bushes. Ass: *Schoe lac, Nupha lut, Typha ang, Carex pata.*
Locally frequent in N Shropshire plain: rare elsewhere.

Heath-grass
Danthonia decumbens (L.) DC.
(Sieglingia decumbens (L.) Bernh.)



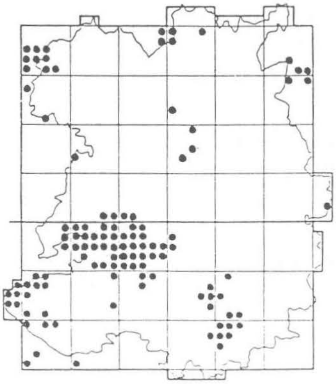
Old species-rich turf in pastures, meadows and heathy grassland, on damp to dry, often poorly drained soils, PN poor, base poor to rich, acid or calc, sun to ½ shade, exposed. Tolerant of heavy grazing and trampling, typical of sites on impoverished soil whether calcareous, acid or heathy. Ass: *Nardu str, Galiu sax, Veron off, Poten ere, Festu ovi, Briza med, Sangu min, Polyg vul.*
Frequent in Oswestry uplands; Central Shropshire hills; Clee hills; and Clun Forest: locally frequent in Newport area: sparse or absent elsewhere in lowlands.

Purple moor-grass
Molinia caerulea (L.) Moench
'Iron-grass'



Poor fens, banks, moorland, valley mire and damp hollows in pasture or open woodland, on wet to moist, poorly drained clay soils or peat, PN poor, base poor to med, acid to mod acid, sun to ½ shade. Withstands mod grazing but competes most effectively on ungrazed waterlogged ground. Apparently spread deliberately on droves or trackways of Fenn's and Whixall Mosses to strengthen the surface for carts laden with peat. Ass: *Eriop ang, Erica tet, Juncu acu, Betul pub, Spha recu, Aula palu.*
Frequent in Oswestry uplands; Central Shropshire hills; Clun Forest; Clee hills; Wyre Forest; and Ellesmere--Whitchurch and Market Drayton areas: sparse elsewhere in lowland.

Mat-grass
Nardus stricta L.



Moorland, heath and rough grassland, on moist to dry but winter-wet and poorly drained peat or soil with thick layer of raw humus, PN poor, base poor, very acid to acid, sunny, exposed, favoured by trampling and heavy grazing. An indicator of impoverished and undrained acid soil and sometimes of former disturbance, not extensively dominant in this region. Ass: *Juncu squ, Galiu sax, Danth dec, Poten ere, Carex bin, Carex pil, Callu vul.*
Frequent on higher ground in Oswestry uplands; Central Shropshire hills; Clun Forest; and Clee hills: very locally frequent in suitable habitats in lowland.

Green bristle-grass
***Setaria viridis** (L.) Beauv.
Casual: by level crossing near Gobowen (1983 BD).

Yellow bristle-grass
***Setaria pumila** (Poiret) Schultes
(S.lutescens (Weigel) F.T. Hubbard)
Casual. Railway sidings at Llanymynech station (1963 *TCSVFC*).

Herbaria containing specimens collected in the Shropshire Region

The following herbaria, listed alphabetically by the abbreviations used by Kent and Allen (1984) and based on the system adopted by the International Bureau for Plant Taxonomy and Nomenclature, contain plant specimens collected by the botanists named under them, generally in order of their dates of birth. Abbreviations used are: § (not certainly including specimens collected within the Shropshire Region); C (century); herb (herbarium); sns (specimens). Dates are given, when known, for deceased collectors for whom they are not supplied in Chapter 2. Much of the information given is based on that published by Kent and Allen (1984).

ABS :	University College of Wales, Aberystwyth C19 herb W H Painter, including sns O M Feilden.
BIRA:	Birmingham City Museum and Art Gallery Herb William Whitwell (1839–1920), including sns R de G Benson.
BM:	British Museum (Natural History) §C17 sns Edward Morgan and Edward Lhywd in vols 54, 83–86 and 113 of herb Sir Hans Sloane. §C18 herb William Withering. §C19 herb Harriet Moseley. §C19 sns Henry Bidwell and W A Leighton. C19 sns W E Beckwith.
BON:	Bolton Museum and Art Gallery §C19 herb W R Crotch and sns W A Leighton in herb P B Mason.
CGE:	University of Cambridge, Botany School C19 herb C C Babington. C19 sns W A Leighton. C20 sns F H Perring, S M Walters and others.
CKE:	Calke Abbey §C19 herb A Bloxam formerly here; not traced.
HWB:	Butler Museum, Harrow School C19–20 herb J C Melvill.
K:	Royal Botanic Gardens, Kew 2 C18 sns Edward Williams in herb John Lightfoot. §C19 sns J E Bowman and A Bloxham. C19 herb W A Leighton. §C19 sns T Salwey, T Butler and T Bodenham in herb H C Watson.
LDL:	Ludlow Museum C19 sns William Phillips. Herb Emily Stedman Farmer, née Smith (1848–1925). Herb M Dorothy Wood (*fl* 1892–1965). C20 sns Ellen R Lloyd, E Banks, Philip H Cornish, Henry Hand, Diana Kingham, later Mullins, William J Norton.
LES:	Leeds City Museum §C18 herb William Wood (700 sns in 8 vols, 50% unlocalised).
LIV:	Merseyside County Museum, Liverpool C19–19 sns Edward Williams. C19 sns J F M Dovaston. §C19 herb (200 sns) J E Bowman in herb A A Dallman. §C20 herb A A Dallman.
MANCH:	University of Manchester, Manchester Museum §C19–20 sns J C Melvill.
MHWK:	Much Wenlock Museum C19 herb W P Brookes.
NMW:	National Museum of Wales, Cardiff §C19 sns J E Bowman and A Bloxam. C19 sns H Bidwell, W Phillips, W E Beckwith, R M Serjeantson and R de G Benson. C19 moss herbarium R de G Benson (and 8 relatives). §C19–20 sns W Whitwell, W P Hamilton and J C Melvill. C19–20 sns O M Feilden. C20 herb Ellen R Lloyd. C20 sns G Potts and E M Rutter. §C20 sns Miss V Janet Macnair (1902–1975).
NOT:	Nottingham Natural History Museum ?§530 C17 sns Edward Lhwyd.
OSWY:	Oswestry Museum C19 herb T P Diamond formerly here; not traced.
OXF:	University of Oxford, Botany School C18 sns Littleton Brown in herb J J Dillenius and herb William Sherard. §C18 herb J J Dillenius. C19 herb Henry Bidwell. §C19 moss herb. J E Bowman. C19 sns W A Leighton and W H Painter.
SHY:	Rowley's House Museum, Shrewsbury C19 sns J F M Dovaston, George Jorden, J E Bowman, T Salwey, T W Wilson, W A Leighton (some *ex* herb), T Butler (some *ex* herb), W P Brookes, §T C Eyton, Francis Dickinson, J S Baly, Thomas Moore (1821–1887), W Phillips, W H Painter, Horace Pearce (1838–1900), W P Hamilton, ?W E Beckwith, R de G Benson and R M Serjeantson (?*ex* herb). C20 sns G Potts, E M Rutter, Miss N M Mackenzie, Miss M H Bigwood and C A Sinker.
SHYB:	Shrewsbury School, Biology Department C19 herb and moss herb R de G Benson.
SHYL:	Shrewsbury School, Library Herb unknown collector 1852–1862 (Bridgnorth area). C19–20 fern herb Edward J Gough (1850–1946), including sns W A Leighton.
TCD:	University of Dublin, Trinity College, School of Botany Herb William M Hind (1815–1894).
WARMS:	Warwickshire Museum §C19 sns J F M Dovaston, George Jorden and A Bloxam. C19 herb W G Perry. C19 sns T Bodenham, G Lloyd, W A Leighton, H Bidwell, J S Baly and George Maw (1832–1912).
WOS:	Worcester City Museum and Art Gallery C19 herb George Jorden. Herb William Mathews (1828–1901).

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Apart from the references listed at the end of Chapter 2, this bibliography contains all the works cited in the Flora. It also draws attention to other material relevant to the botany of the Shropshire Region. Works of considerable introductory or general interest are marked with an asterisk*. Internal documents, unpublished works and theses are placed in square brackets.

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Gazetteer

Letters and numerals against each entry are its National Grid reference in the 100km squares SO(32) or SJ(33); 2, 4 or 6 figure references are given according to the size of the place. 'Addresses' are given for unofficial local names and for places of lower cartographical importance than parish villages.

In cases of disputed spelling or punctuation of current names the form used on recent editions of Ordnance Survey maps is generally given, but hyphens have been avoided.

APE DALE	Large place or extensive physical feature
$	Place not in Shropshire
($)	Place partly in Shropshire
†	Disused canal
(†)	Partially disused canal
[Arcoll]	Obsolete or garbled spelling; lost or destroyed site; or not traced

($) Abbot's Castle Hill (partly in Staffs) nr Claverley SO 82-94-
Abdon SO 57-86-
Abdon Burf (hillfort), Brown Clee Hill SO 59-86-
Abertanat nr Llanyblodwel SJ 250218
[Abery Wood] *see* Ebreywood
Ackleton nr Badger SO 77-98-
Acton and A Bank nr Colebatch SO 31-84- etc
Acton Burnell SJ 53-02-
Acton Pigott nr Acton Burnell SJ 542027
Acton Round SO 63-95-
Acton Scott SO 45-89-
Adderley nr Market Drayton SJ 66-39-
$ Adforton (Herefs) SO 40-71-
($) Adley Moor and A Common (partly in Herefs) nr Bedstone SO 38-74-
Adstone Hill nr Wentnor SO 38-94-
Aeksea and Turfmoor nr Kinnerley SJ 35-19-
[Aiksmore Coppice]: *perhaps* Hawksmoor Coppice nr Astley SJ 513189
Alberbury nr Ford SJ 36-14-
Albright Hussey, Albrighton nr Shrewsbury SJ 502176
Albrighton nr Shifnal SJ 81-04- etc
Albrighton nr Shrewsbury SJ 49-18-
Alcaston nr Acton Scott SO 45-87-
Alcaston Coppice, Wenlock Edge SO 46-86-
Alkmond [Almond] Park and Pool SJ 48-15- etc
Allman's Bridge, S U Canal nr Whixall SJ 491349
Allscott sugar beet works nr Wrockwardine SJ 60-12-
All Stretton SO 46-95-
Alveley SO 76-84-
Anchor Inn, Clun Forest SO 175851
APE DALE SO 48,59
Apley Terrace nr Stockton SO 72-97-
$ Aqualate Mere (Staffs) nr Newport SJ 77-20- etc
[Arcoll] *see* Ercall, the
$ Arddleen nr Llandysilio (Monts) SJ 260160
Arley *see* Upper Arley
Arscott nr Great Hanwood SJ 43-07-
Ash Coppice, Barrow nr Much Wenlock SJ 639004
Ashes Hollow (valley), Long Mynd SO 42-93- etc
Ashfield nr Ditton Priors SO 58-89-
Ashfield, Maesbury nr Oswestry SJ 309257
Ashford Bowdler SO 51-70-
Ashford Carbonel SO 52-70-
$ Ashley, A Dale and A Heath (Staffs) SJ 75-36- etc
Ash Magna and A Parva nr Whitchurch SJ 57-39-
Asterley nr Minsterley SJ 37-07-
Asterton nr Wentnor SO 398912
Astley SJ 53-18-
Astley Abbotts SO 70-96-
Aston nr Claverley SO 80-93-
Aston nr Wem SJ 53-28-
Aston Botterell SO 63-84-
Aston Eyre and A Hill SO 65-94- etc
Aston Hall nr Oswestry SJ 32-27-
Aston Locks (canal) SJ 33-26- etc
Aston (Munslow) or Munslow A, A Hall and A Deans SO 51-86- etc
Aston on Clun nr Clunbury SO 39-81-
Aston Pigott, A Rogers and A Hill nr Worthen SJ 33-06- etc
Atcham and A Bridge SJ 54-09-
Attingham Park (formerly Adult College) nr Atcham SJ 550099
Babbins Wood nr Whittington SJ 33-29-, 33-30-
Badger and B Dingle SO 76-99-, 77-99-
BAGGY MOOR SJ 32, 42
Bagley and B Marsh SJ 40-27-
$ BAILEY HILL (Rads) SO 27
Barnsley Pool, Roughton nr Bridgnorth SO 753927
Baschurch SJ 42-21-
Batch, the, nr All Stretton SO 45-95-
Batholes, Hope nr Minsterley SJ 339006
Battery *see* Buttery
Battlefield nr Shrewsbury SJ 51-17-
$ Bausley Hill, Crew Green (Monts) SJ 32-14-
Baveney Brook SO 67,77
Baveney Wood nr Cleobury Mortimer SO 69-79-
Bayston Hill SJ 48-08-
$ Bayton (Worcs) SO 69-73-
Beamish (farm) nr Albrighton SJ 828045
Beckbury SJ 76-01-
Bedstone SO 36-75-
Bedstone Hill SO 35-75- etc
$ Beguildy (Rads) SO 19-79-
$ Belan Bank, Crew Green (Monts) SJ 319158
$ Bele Brook (Monts) SJ 26-14-, 26-15-, 27-15-
Belle Vue, Shrewsbury SJ 49-11-
Benthall SJ 66-02-
Benthall Edge (Wood) nr Ironbridge SJ 65-03-, 66-03-
Benthall Hall nr Ironbridge SJ 658026
Benthall House nr Broseley SJ 668021
Bentlawnt nr Minsterley SJ 33-01-
$ Berriew (Monts) SJ 18-00-
Berrington SJ 52-06-
Berrington Moss SJ 526066
Berrington Pool SJ 525072
Berth Pool and The Berth (hillfort) nr Baschurch SJ 430235
Berwick House and B Chapel nr Shrewsbury SJ 47-14-
Berwick, Upper, nr Shrewsbury SJ 472159
Berwick Wharf nr Atcham SJ 544108
Betchcott and B Hollow nr Woolstaston SO 43-98-, 44-98-
$ Bettisfield (Flints) SJ 46-35-
$ Bettisfield Moss (Flints) SJ 47-35-
Betton nr Market Drayton SJ 69-36-
Betton Abbots nr Berrington SJ 51-07-
Betton Alkmere and B Strange nr Shrewsbury SJ 50-09-
Betton Coppice SJ 50-08-, 51-08-
Betton Dingle nr Worthen SJ 317023
Betton Moss nr Market Drayton SJ 681366
Betton Pool, Betton Abbots nr Berrington SJ 510078
Betton Upper Pool *see* Top Pool
Bettws y Crwyn [and B Pool] SO 205813
$ BEWDLEY (Worcs) SO 78-75-
Bickley Coppice nr Bicton SJ 440160
Bicton nr Clun SO 28-82-
Bicton nr Shrewsbury SJ 44-15-
Billingsley nr Highley SO 71-85-
Birch and B Pool nr Ellesmere SJ 403337
Birchgrove Pool nr Baschurch SJ 435232
[Birmingham and Liverpool Junction Canal] *see* Shropshire Union C (main line)
BISHOP'S CASTLE SO 38
$ BISHOP'S WOOD (Staffs) SJ 73
Bitterley SO 56-77-
$ Blackbrook nr Maer (Staffs) SJ 76-38-
[Blacker's-ford] *see* Blackhurst Ford
Black Hill nr Clun SO 32-79- etc
Blackhurst Ford, Northwood nr Wem SJ 462334
Black Knoll, Long Mynd SO 39-88-
Black Marsh nr Shelve SO 32-99-
Black Mountain, Clun Forest SO 19-83-
Black Rhadley Hill nr More SO 34-95-
Black Ven, Bucknell (not traced)
Blake [Black] Mere nr Ellesmere SJ 417339
Blake Mere nr Whitchurch SJ 558426
Blakemoorflat and Blakemoorgate, Stiperstones SJ 37-00-, 37-01-
Blakeridge Wood nr Bishop's Castle SO 30-86- etc
Blakeway Coppice, Wenlock Edge SO 59-98- etc
Blakeway Hollow nr Much Wenlock SO 60-99-
Blists Hill, Coalport (Telford) SJ 69-03-
Blodwel Rock and B Wood, Llynclys Hill SJ 26-22-
$ Blymhill nr Weston (Staffs) SJ 81-12-
$ Bobbington (Staffs) SO 80-90-
Bog, the, Cranmere nr Worfield SO 753976
Bog, the, (mine) nr Shelve SO 35-97-
$ Bogs, the, Blackbrook nr Maer (Staffs) SJ 77-38-
Boiling Well, Linney, Ludlow SO 508752
Boiling Well, Long Mynd SO 421946
Bomere Heath nr Shrewsbury SJ 47-19-
Bomere Pool nr Baystonhill SJ 500080
Boningale nr Albrighton SJ 81-02-
Boodle's Bridge, S U Canal nr Whixall SJ 497337
Boraston SO 61-70-
Boreatton Park nr Ruyton XI Towns SJ 40-24- etc
Boreton Bank nr Berrington SJ 517070
Boreton Bridge SJ 516068
Borle Brook SO 78 etc
[Borough Ditches] *see* Bury Ditches
Boscobel nr Tong SJ 837082
Bourton nr Much Wenlock SO 59-96-
Bowhills Dingle nr Alveley SO 78-84- etc
Bowmanshill [Beaumont Hill] nr Quatford SO 73-91- etc
Boyne Water nr Burwarton SO 600847
($) Braggington Coppice (partly in Monts) nr Wollaston SJ 332142
$ Brampton Bryan and B B Castle (Herefs) SO 37-72-
$ Breidden Hill(s) *or* Mountain (Monts) SJ 29-14- etc
Brick House nr Bromfield SO 463741
$ Bridewell, Bewdley (Worcs) SO 786771
Bridges nr Ratlinghope SO 39-96-
BRIDGNORTH SO 79
$ Brimford House nr Criggion (Monts) SJ 308150
($) BRINGEWOOD CHASE (forest, partly in Herefs) nr Ludlow SO 47
$ Bringewood Forge Bridge nr Downton Castle (Herefs) SO 454750
$ Brithdir nr Corndon Hill (Monts) SO 301952
Brockton nr Shipton SO 57-93-
Brockton nr Worthen SJ 31-04-
Brogyntyn nr Oswestry SJ 27-31-
Bromfield SO 48-76-
Bromlow Callow (hill), Bentlawnt nr Minsterley SJ 325012
Broncroft Castle nr Tugford SO 545867
$ Bronington (Flints) SJ 48-39-
Brook Coppice nr Habberley SJ 39-01-
Brook House, Ashford Carbonel SO 525706 (perhaps more likely than next entry for record on p. 28)
Brook House, Middleton nr Ludlow SO 541776

Brooks Hill nr Shelve SO 34-96-
Broom Hall nr Oswestry SJ 280290
Broom Hill nr Church Pulverbatch SJ 41-03-
Broseley and B Wood nr Ironbridge SJ 67-01-
Brown Clee Hill SO 59-84-, 59-85-, 59-86-
Brownheath Moss, English Frankton nr Loppington SJ 460302
Brownhill nr Ruyton XI Towns SJ 40-22-
Brown Moss nr Whitchurch SJ 56-39-
Bubney Moor nr Whitchurch SJ 51-41-
Bucknell SO 35-73-
Buildwas SJ 63-04-
Buildwas Abbey SJ 643043
Buildwas Bridge SJ 645044
Buildwas Park SJ 62-03-
Bulthy and B Hill nr Wollaston SJ 31-13-
Burcotgate nr Wrockwardine SJ 618106
Burf Castle nr Quatford SO 763909
Burford SO 58-68-
$ Burgedin Locks (S U Canal) nr Arddleen (Monts) SJ 253147
Burgs, the, Baystonhill nr Shrewsbury SJ 490087
Burlton nr Myddle SJ 45-26-
$ Burnt Wood nr Loggerheads (Staffs) SJ 74-34- etc
$ Burrington and B Common (Herefs) SO 44-72-
Burwarton SO 61-85-
Burway, the, Long Mynd SO 44-94- etc
Burway nr Ludlow SO 501757
Bury Ditches (hillfort) nr Clun SO 32-83-
Bushmoor nr Wistanstow SO 430880
Buttery (Farm) nr Kynnersley SJ 688170
$ Buttington nr Welshpool (Monts) SJ 25-09-
($) Buttonoak (partly in Worcs) nr Bewdley SO 75-78-
Byne Brook SO 48
$ Cadney Moss nr Bettisfield (Flints) SJ 470347
Cae Howel nr Melverley SJ 349174
($) Caebitra (R) (partly in Monts) SO 29
Caer Caradoc (hillfort) nr Chapel Lawn SO 310758
Caer Caradoc (hill and hillfort) nr Church Stretton SO 47-95-
Calcott and C Moss nr Bicton SJ 450140
$ Calcott Hall nr Llandrinio (Monts) SJ 289190
Callaughton nr Much Wenlock SO 618974
Callow Hill nr Craven Arms SO 460850
Callow Hollow, Long Mynd SO 42-92- etc
Calverhall nr Market Drayton SJ 60-37-
Camlad, R SO 29; SJ 20
Canals *see* Shropshire Union Canal
Candy (Valley), Nantygollen nr Trefonen SJ 25-28-
Canonbury, Shrewsbury SJ 487119
Cantlop (farm) nr Condover SJ 523058
[Canton Rough] *see* Cantern Brook
Cantern Brook nr Bridgnorth SO 70-94- etc
Cardeston nr Ford SJ 39-12-
Cardingmill Valley, Long Mynd SO 44-94- etc
Cardington SO 50-95-
$ Carreghofa (Monts) nr Llanymynech SJ 25-21-
Carregybig nr Selattyn SJ 253323
Castle Fields, Shrewsbury SJ 50-13-
Castle Pulverbatch SJ 42-02-
Catherton Common nr Cleobury Mortimer SO 63-78- etc
Catherton Marshes SO 64-78-
Cause Castle and Causebeach nr Westbury SJ 33-07- etc
Caynham, C Camp (hillfort) and C Court nr Ludlow SO 54-73-, 55-73-
Caynton Gorse, C House, C Manor, New C and Old C nr Edgmond SJ 70-21- etc
Cefn Einion nr Mainstone SO 286860
Cefn Gunthly nr More SO 33-94- etc
$ Cefnsuran nr Llangunllo (Rads) SO 229710
($) Ceiriog, R (partly in Denbs) SJ 23, 33
Chapel Lawn nr Clun SO 31-76-
Charlton Hill, Donnington nr Wroxeter SJ 58-07-
Chatwall Hall nr Church Preen SO 514975
Chelmarsh SO 72-87-
Chelmick SO 46-91-
Cheney Longville nr Wistanstow SO 42-84-
Chermes Dingle nr Leighton SJ 61-06-
Cherrington SJ 66-19-
Chesterton nr Worfield SO 78-97-
Cheswardine SJ 71-29-
Chetton SO 66-90-
Chetwynd Aston nr Newport SJ 75-17-
Chetwynd Heath nr Newport SJ 71-22-
Chetwynd (Park) nr Newport SJ 73-21-
Child's Ercall SJ 66-25-
Chilton and C Grove nr Atcham SJ 53-09-, 52-09-
Chipnall nr Market Drayton SJ 72-31-
Chirbury SO 26-98-
$ CHIRK (Denbs) SJ 23
$ Chirk Castle (Denbs) SJ 268380
Chorley nr Stottesdon SO 69-83-
Chorley Covert nr Billingsley SO 70-83-
Church Aston nr Newport SJ 74-17-
Church Preen SO 54-98-
Church Pulverbatch SJ 43-02-
$ Church Stoke (Monts) SO 27-94-
CHURCH STRETTON SO 49
Clarepool [Welshampton] Moss SJ 433343
Claverley SO 79-93-
Clee Burf (hillfort), Brown Clee Hill SO 59-84-
Cleehill (village) SO 59-75-
Clee Hill SO 60-77-
CLEE HILLS SO 57, 58
Clee St Margaret SO 56-84-
Cleeton St Mary nr Silvington SO 611787
Cleobury Mortimer SO 67-75-
Cliffe, the, nr Ruyton XI Towns SJ 39-20-
Clive SJ 51-24-
Cloud Coppice nr Berrington SJ 544064
Cloverley Hall and C Pool nr Calverhall SJ 61-37-, 61-36-
$ Clows Top nr Rock (Worcs) SO 71-71-
Clun SO 30-80-
Clun, R SO 28, 38, 37 etc
Clunbury and C Hill SO 37-80- etc
[Clun Dale] *see* Cwmdale
CLUN FOREST (plateau) SO 28 etc
Clun Hill SO 302790
Clungunford SO 39-78-
Clunton nr Clun SO 33-81-
Clunton Coppice nr Clun SO 34-80-
Coalbrookdale (Telford) SJ 66-04-
Coalmoor, Little Wenlock SJ 660070
Coalpit Plantation, Chipnall nr Market Drayton SJ 715317
Coalport, Telford SJ 69-02-
Coalport Canal, Telford SJ 695026
Coats Wood nr Rushbury SO 520910
Cockshutford nr Clee St Margaret SO 580850
Cockshutt SJ 43-29-
Coedyrallt nr St Martin's SJ 32-39-
Cold Hatton nr Waters Upton SJ 62-21-
Cold Hatton Heath [and C H Moss] nr Waters Upton SJ 63-21-
Coldyeld *or* Cold Hill (farm) nr Ratlinghope SO 365963
Colebatch nr Bishop's Castle SO 318870
Cole Mere nr Ellesmere SJ 43-33- etc
College Coppice nr Minsterley SJ 350030
$ Combermere Abbey, Mere and Park (Ches) SJ 58-44- etc
[Comb-Floy'd]: *presumably* [Cwm Llwyd], *perhaps* Hell Hole nr Bishop's Castle SO 305865
Condover SJ 49-05-
Conquermoor Heath nr Cherrington SJ 676194
Coptiviney nr Ellesmere SJ 410370
Corbet Wood, Grinshill SJ 526237
Coreley SO 61-73-
Corfton nr Diddlebury SO 49-84-
($) Corn Brook (partly Worcs border) SO 67, 66
$ Corndon Hill nr Church Stoke (Monts) SO 30-96-
Corve, R SO 69, 59, 58, 48, 47, 57
CORVE DALE SO 58 etc
Cosford nr Albrighton SJ 79-05-
Cothercott (Hill and mine) nr Church Pulverbatch SJ 40-00-, 41-00-
Coton Hill, Shrewsbury SJ 48-13-
Cottage Pond nr Little Ness SJ 419183
Cound SJ 55-04-
Coundarbour sand quarry nr Cound (*see also* Venus Bank) SJ 55-05-
Cound Brook SJ 40, 50
Coundmoor nr Cound SJ 55-02-
($) Coxall Knoll (hillfort, partly in Herefs) nr Bucknell SO 36-73-
Crackleybank nr Sheriffhales SJ 76-11-
$ Craig Breidden on Breidden Hill (Monts) SJ 288140
Craigforda nr Trefonen SJ 25-29-
Craig Llwyn nr Trefonen SJ 237276
Craignant nr Selattyn SJ 25-35-
Craig Sychtyn nr Trefonen SJ 23-25-
Craigyrhiw, Rhydycroesau nr Oswestry SJ 23-29-
Cramer Gutter, Catherton Common SO 64-79-, 65-79-
Cranberry Rock, Stiperstones SO 366981
Cranmere (Farm) nr Worfield SO 755975
Craven Arms SO 43-82-
Cressage SJ 59-04-
$ Crew Green nr Llandrinio (Monts) SJ 32-15-
Crickheath and C Wharf, Llynclys nr Oswestry SJ 29-23-
$ Criftin Ford Bridge, Paytoe nr Adforton (Herefs) SO 420720
Criftins *see* Dudleston Heath
$ Criggion Quarry, Breidden Hill (Monts) SJ 29-14-
Cronkhill nr Atcham SJ 535082
Crose Mere nr Cockshutt SJ 430305
Crosshill nr Shrewsbury SJ 495154
Cross Houses nr Berrington SJ 53-07-
Crowsnest Dingle, Stiperstones SJ 37-01-
Cruckmeole nr Great Hanwood SJ 43-09-
Cruckton nr Great Hanwood SJ 43-10-
Cruckton Hall nr Great Hanwood SJ 429101
Crudgington SJ 63-18-
Crudgington Moor SJ 64-17-, 65-17-
Crumpsbrook and Lubberland, Catherton Common SO 62-78-
Cuckoopen Coppice nr Hopton Cangeford SO 537800
Culmington SO 49-82-
Cupid's Ramble [and Fairyland], Aston Moor nr West Felton SJ 33-25-
Cutbury Hollow, Leaton nr Shrewsbury SJ 455185
Cwmdale nr All Stratton SO 45-94-
$ Cwmdulla nr Corndon Hill (Monts) SO 290964
Cwms nr Caer Caradoc SO 47-94-
Cwm Sanahan Hill nr Llanfair Waterdine SO 270755
($) Cynllaith, R (partly in Denbs) SJ 23, 22
Dale Coppice and Paradise, Coalbrookdale SJ 67-04-
Darnford nr Ratlinghope SO 41-97-, 42-97-
Davenport House nr Worfield SO 753954
Dawley (Telford) SJ 68-07-
Dawley Castle Pools (Telford) SJ687060
($) DEE, R SJ 34
Deer Park, Attingham nr Atcham SJ 55-09-
Deer Park (Loton Park), Alberbury nr Ford SJ 35-13-
Detton (Hall) nr Neen Savage SO 66-79-
$ Devil's Chair, Craigydon Wood nr Knucklas (Rads) SO 264737
Devil's Chair [Arm-chair], Stiperstones (rock) SO 368991
Devil's Dingle nr Buildwas SJ 63-05-
Diddlebury [Delbury] SO 50-85-
Diddlebury Common SO 48-86-
Dinham and D Bridge, Ludlow SO 507744
Disgwylfa Hill nr More SO 32-93-
Ditch Dingle, Clun Forest SO 22-86-
Ditton Priors SO 60-89-
Dobson's Bridge, S U Canal nr Whixhall SJ 492343
Dolgoch Quarry, Llynclys nr Oswestry SJ 276246
[Dominican Friary], St Mary's Water Lane, Shrewsbury SJ 494126
Donnerville House nr Wellington SJ 638124
Donnington (Telford) SJ 70-13-
Donnington nr Wroxeter SJ 580079
[Donnington Glasshouse] SJ 698128

† Donnington Wood Canal SJ 71
Donnington Wood, Telford SJ 70-12-
Dorrington nr Woore SJ 74-40-
Dorrington nr Condover SJ 47-02-
Dorrington Sandpit nr Stapleton SJ 476040
[Dorset's Barn], Shrewsbury SJ 498130
Dothill Park nr Wellington SJ 64-12-
Dovaston nr Kinnerley SJ 34-21-
($) Dowles Brook [and Dowle Wood] (Worcs border) SO 77
Downton nr Upton Magna SJ 543529
$ Downton Castle nr Leintwardine (Herefs) SO 445747
Downton Hall nr Stanton Lacy SO 528794
$ Downton on the Rock nr Leintwardine (Herefs) SO 42-73-
Dryton nr Wroxeter SJ 58-06-
Duckland, Pentre nr Nesscliff SJ 353178
Duckow, R SJ 64
Dudleston Heath *or* Criftins nr Ellesmere SJ 36-36-
Dudmaston Hall, Quatt SO 74-88-
Dudston nr Chirbury SO 24-97-
Duncot nr Atcham SJ 573114
Eardington SO 72-90-
Earlsdale nr Pontesbury SJ 413057
Earls Hill (nature reserve) nr Pontesbury SJ 40-04-
Easthope and E Wood SO 56-95- etc
East Onny, R SO 39
Eastridge and E Wood nr Habberley SJ 38-02-
Eaton Brook (*see also* Byne Brook) SO 48 etc
Eaton Constantine nr Leighton SJ 59-06-
Eaton Mascott nr Berrington SJ 53-05-
Eaton (under Heywood) nr Rushbury SO 499900
Ebnal Hall and E Lodge nr Gobowen SJ 31-34-
Ebreywood [Abery Wood] nr Astley SJ 54-17-
Ebury Hill (fort), Haughton nr Shrewsbury SJ 546165
Edenhope Hill, Clun Forest SO 25-88- etc
Edgebolton nr Shawbury SJ 571219
Edgerley nr Kinnerley SJ 357182
Edgerly nr Kinnerley SJ 343193
Edge, Yockleton nr Westbury SJ 399089
Edge Wood nr Much Wenlock SJ 610004
Edge Wood, Presthope, Wenlock Edge SO 57-97-
Edge Wood nr Westhope, Wenlock Edge SO 476874
Edgmond SJ 72-19-
Edgton SO 38-85-
Edstaston nr Wem SJ 520320
[Ellerdine Moss] and E Heath nr Waters Upton SJ 61-21-
ELLESMERE SJ 33
[Ellesmere Canal] *see* Shropshire Union C
Ellesmere Mere *see* Mere, the, Ellesmere
English Frankton nr Loppington SJ 45-29-
Ercall [Arcoll], the, (hill) nr the Wrekin SJ 644096
Ercall Heath nr Child's Ercall SJ 68-23-
Eudon Burnell nr Chelmarsh SO 69-89-
Evenwood Common nr Acton Burnell SJ 55-02-
Exfordsgreen nr Stapleton SJ 460060
$ Eymore Wood nr Upper Arley (Worcs) SO 77-79-
Eyton Hall and E upon the Weald Moors SJ 65-14-
Eyton on Severn nr Wroxeter SJ 573062
Faintree nr Chetton SO 66-88-
[Fairyland] *see* Cupid's Ramble
$ Far Forest nr Bewdley (Worcs) SO 72-75-
Farley, F Coppice and F Dingle nr Much Wenlock SJ 63-02-
Farley nr Pontesbury SJ 387080
Farlow SO 63-80- etc
$ Felindre nr Beguildy (Rads) SO 16-81-
Felton Farm nr Ludlow SO 501767
Fenemere [Fenny Mere] nr Baschurch SJ 445228
$ Fenn's Bank nr Bronington (Flints) SJ 510390
$ FENN'S MOSS (Flints) SJ 43
Fernhill Hall nr Whittington SJ 32-32-
Fettes, the, (farm) Edgerley nr Kinnerley SJ 34-19-
$ Ffriddfaldwyn (hillfort) nr Montgomery SO 217970
Fiddler's Elbow, Black Hill nr Clun SO 321785
Fitz and F Mill nr Montford Bridge SJ 44-17-, 44-18-
Five Springs, the, Brown Clee Hill SO596853
Flat Coppice nr Plowden SO 38-87-
Flying Dingle nr Worthen SJ 28-04-
$ Foel Coppice nr Trewern (Monts) SJ 282133
Folly Brook SO 28
Ford SJ 41-13-
$ Forden (Monts) SJ 22-00-
Forton and F Heath nr Montford Bridge SJ 43-16-
$ Forton (Staffs) SJ 75-21-
Fox Farm nr Shrewsbury SJ 520093
Frankton *see* Welsh F
Frankwell, Shrewsbury SJ 48-12-
Frodesley and F Hill SJ 51-01-
Fron nr Chirk SJ 26-35-
Fron Wood nr Mainstone SO 27-87-
[Furnace and Sturt's Coppice], Wyre Forest: *probably either* former coppice NW of Furnace Mill Farm SO 720764 and The Sturt SO 723772 *or* wood nr Lower Forge SO 69-74- and Sturt Coppice nr Prizeley SO 69-75-
$ Gaer, y, (hillfort) and G Bank nr Meifod (Monts) SJ 20-15-
[Gallows-Tree Bank] nr Oswestry SJ 299285
Gatten Lodge nr Habberley SO 390992
Giant's Chair, Titterstone Clee Hill SO 594780
$ Giant's Head, Llanymynech Hill (Monts) SJ 261217
$ Glan Hafren nr Welshpool (Monts) SJ 228045
$ Glan Severn nr Berriew (Monts) SJ 19-00-
Gleedon [Gleeton] Hill nr Much Wenlock SJ 62-01-
$ Glyn Ceiriog (Denbs) SJ 20-37, 20-38-
Gobowen nr Oswestry SJ 30-33-
Gogbatch nr Woolstaston SO 46-96- etc
Golding [Golden] and G Pool nr Pitchford SJ 54-03-
Goldstone Common nr Hinstock SJ 70-29-
Gorstley Wood nr Hope Bagot SO 58-74-
Gouter, the, nr Berrington SJ 53-06-
Grafton nr Montford Bridge SJ 43-18-
Great Bolas and Little B nr Waters Upton SJ 64-21-
Great Hanwood SJ 44-09-
$ Great Hem nr Forden (Monts) SJ 235002
Great Hudwick Dingle nr Monkhopton SO 63-92-
Great Ness SJ 39-18-
Great Sutton and Little S nr Diddlebury SO 51-82-
$ Gredington (park) nr Hanmer (Flints) SJ 44-38-
$ Green Dragon Bridge (S U Canal), Burgedin nr Arddleen (Monts) SJ 254150
Greet SO 57-70-
Grinshill and G Hill SJ 52-23-
Grotto Hill, Hawkstone Park nr Hodnet SJ 573298
Guilsfield Canal *see* Shropshire Union C
Gwarthlow nr Chirbury SO 24-95-
Habberley Valley nr Pontesbury SJ 30, 40
Hadley (Telford) SJ 67-11- etc
Hadnall SJ 52-20-
Halford SO 437833
Halfway House nr Westbury SJ 340115
Hall of the Forest, Clun Forest SO 209836
Halston Hall nr Whittington SJ 34-31-
Hammermill Hill nr Boraston SO 60-69-
Hampton and H Loade nr Alveley SO 74-86-
[Hampton] *see* Welshampton
Hampton Bank nr Welshampton SJ 45-34-
Hampton Beech (dingle wood) nr Worthen SJ 30-05-
$ Hanmer Mere [Hanmere] (Flints) SJ 454394
Hanwood *see* Great H
Hardwick nr Ellesmere SJ 37-34-
[Haremeare] *see* Harmerhill
Hargrove Wood nr Rushbury SO 50-92-
Harley SJ 59-01-
Harley Bank *or* H Hill SJ 607003
Harmerhill [*formerly* Haremeare] SJ 48-22-
Harnage, Cound SJ 566041
Harper Adams Agricultural College, Edgmond SJ 71-20-
Harriot's Hayes nr Albrighton SJ 83-05-
Harton, H Hollow and H Wood nr Acton Scott SO 48-88-
[Harwood's Boat-house], Shrewsbury SJ 484125
Hatton *see also* Cold H, High H, Hungry H
Hatton nr Acton Scott SO 46-90-
Hatton Grange nr Shifnal SJ 76-04-
Hatton Hill nr Shifnal SJ 77-05-
Hatton Hine Heath *see* Hine Heath
Haughmond Abbey nr Shrewsbury SJ 541151
Haughmond Hill SJ 54-13- etc
Haughton nr Shrewsbury SJ 55-16-
Hawkham Hollow, Long Mynd SO 43-97-
Hawk Lake, Hawkstone Park nr Hodnet SJ 57-30- etc
Hawkstone (Park) nr Hodnet SJ 57-29-, 58-29-
[Hawkstone Pool]: *probably* Hawk Lake (*see above*)
Hawthorn Dingle, Shirlett nr Much Wenlock SO 650970
$ Haye Park, Richard's Castle (Herefs) SO 48-71-
Hayes, Alberbury nr Ford SJ 35-15-
Hayes, Oswestry SJ 281302
Haygate nr Wellington SJ 63-10-
Hayton's Bent nr Culmington SO 51-80-
Hazler Hill nr Hope Bowdler SO 46-92-
Heath Mynd nr More SO 33-94- etc
$ Heldre Hill, Long Mountain (Monts) SJ 28-09-
Helmeth Hill nr Hope Bowdler SO 470940
$ Hem, the, and H Moor nr Forden (Monts) SJ 24-00-
Hemford, Hope Common nr Shelve SJ 32-00-
Hencott [Hancott] Pool nr Shrewsbury SJ 491160
Hengoed nr Oswestry SJ 29-33-
Henley nr Ludlow SO 54-76-
$ Heyop, Knucklas nr Knighton (Rads) SO 24-73-
High Ercall SJ 59-17-
High Fawr [Vawr] nr Oswestry SJ 273298
High Grosvenor nr Claverley SO 77-93-
High Hatton nr Hodnet SJ 61-24-
Highley SO 74-83-
High Rock nr Bridgnorth SO 724940
Hill End nr Cardington SO 50-94-
Hill End Farm, Mainstone SO 27-87-
Hilltop nr Easthope SO 570963
Hilton nr Worfield SO 77-95-
Hine Heath [Hatton H H] SJ 58-25-
Hinkshay or Stirchley Pools (Telford) SJ 695070
Hinstock SJ 69-26-
Hinton nr Pontesbury SJ 410080
Hints [Hintz] nr Coreley SO 61-75-
Hoard's Park nr Bridgnorth SO 715947
Hoar Edge nr Cardington SO 50-97- etc
Hoar Edge, Clee Hill SO 59-76-
Hoar Stones (stone circle), Black Marsh nr Shelve SO 324999
Hobarris nr Chapel Lawn SO 311781
Hodnet SJ 61-28-
Hodnet Heath SJ 62-26- etc
Hodre Pond, Chapel Lawn nr Clun 325770
Hogstow nr Minsterley SJ 36-01-
Holdgate [Holgate] SO 56-89-
Hollies, the, (farm) nr Ratlinghope SO 379990
Hollies, the, (park woodland) nr Habberley SJ 38-01-
Holloway Rocks, Stow Hill nr Knighton SO 313742
Holly Coppice, Haughmond Hill SJ 550150
Holywell (mine), Telford Town Park SJ 693073
Homer [and H Common] nr Harley SJ 61-01-
Hookagate nr Shrewsbury SJ 46-09-
Hope nr Minsterley SJ 34-01-
Hope Bagot SO 58-74-
Hope Bowdler SO 47-92-

Hope Bowdler Hill SO 47-94- etc
Hope Common nr Shelve SJ 33-00-
HOPE DALE, Wenlock Edge SO 48, 58, 59
Hopesay, H Common and H Hill SO 39-83-
Hope Valley nr Minsterley SJ 30
Hopton and Lower H nr Nesscliff SJ 38-20-
Hopton Cangeford or H in the Hole nr Ludlow SO 54-80-
Hopton Titterhill, Hopton Castle SO 35-77-
Horderley nr Wistanstow SO 410870
Hordley SJ 38-30-
Horsehay and H Pool (Telford) SJ 67-07-
Hough's Coppice nr All Stretton SO 469955
Hughley SO 56-97-
Huglith and H Hill nr Habberley SJ 40-02-
Hungryhatton nr Child's Ercall SJ 67-26-
$ Hurdley nr Church Stoke (Monts) SO 296942
$ Hyssington nr Church Stoke (Monts) SO 31-94-
$ Hyssington Marsh nr Corndon Hill (Monts) SO 31-96-
Ightfield and I Heath nr Whitchurch SJ 59-38-, 59-37-
Incham Coppice nr Ashford Carbonel SO 542717
Inwood, All Stretton nr Church Stretton SO 460965
Ironbridge and I Gorge SJ 67-03-
Isle, the, I Grange, I Park and I Pool nr Bicton SJ 46-17-
Jackfield nr Ironbridge SJ 68-02-
Jacob's Ladder, Penycoed, Llynclys Hill SJ 268232
$ Jacob's Ladder, Trimpley nr Bewdley (Worcs) SO 79-78-
Jones's Rough, Nantmawr nr Llanyblodwel SJ 247247
Judith [Judas] Butts, Shrewsbury SJ 508135
$ Kempster's Hill (Monts) nr Wollaston SJ 31-14-
Kempton nr Clunbury SO 360830
Kenley SJ 56-00-
Kenwick nr Cockshutt SJ 421304
Ketley (Telford) SJ 67-10-
Ketleybank SJ 69-10-
Kettle Mere nr Ellesmere SJ 418341
Kinlet nr Cleobury Mortimer SO 71-80-
Kinnerley SJ 33-20-
Kinnerton nr Ratlinghope SO 378963
Kinsley Wood nr Knighton SO 28-72- etc
Knapp *see* Napp
$ KNIGHTON (Rads) SO 27
Knockin SJ 33-22-
Knockin Heath SJ 35-21-
Knolls, the, (wood) Broomfields nr Montford Bridge SJ 424174
Knolls, the, Stiperstones SO 36-97-
Knowbury nr Cleehill SO 57-75-
Knowle Wood nr Hope Bagot SO 60-73-
$ Knucklas nr Knighton (Rads) SO 25-74-
[Krew Green] *see* Crew Green
Kynaston nr Kinnerley SJ 35-20-
Kynnersley SJ 67-16-
Ladywood nr Ironbridge SJ 67-03-
$ Lan Fawr nr Corndon Hill (Monts) SO 29-96-
Langley *see* Ruckley and L
Laplow Bank nr Edgton SO 390850
Lawley and Lawleybank (Telford) SJ 66-08- etc
Lawley, the, (hill) nr Leebotwood SO 49-97- etc
Lawn Hill nr Pulverbatch SJ 410026
Lawrence's Hill nr The Wrekin SJ 640093
Lea and Lea Cross nr Great Hanwood SJ 41-08-
Lea Hall (farm), Pim Hill nr Myddle SJ 492210
Leaton nr Shrewsbury SJ 46-18-
Leaton Knolls nr Shrewsbury SJ 47-16-
Ledwyche Brook SO 57 etc
Lee (moors) nr Ellesmere SJ 41-32-
Leebotwood SO 47-98-
Lee Brockhurst SJ 54-27-
Lee Dingle, Madeley SJ 694036
Leegomery nr Wellington (Telford) SJ 66-12-
Leighton nr Buildwas SJ 61-05-
$ Leighton nr Welshpool (Monts) SJ 24-05-
$ Leintwardine (Herefs) SO 40-74-
$ Lem Hill nr Bewdley (Worcs) SO 72-74-
Lightmoor nr Ironbridge (Telford) SJ 67-05-
Light Spout, the, Long Mynd SO 430950
Lilleshall and L Hill SJ 73-15-, 72-15-
Lilleshall Abbey SJ 738142
Lilleshall Pond SJ 732154
Lilleshall Quarry, Hilltop nr Easthope SO 574966
Limekiln [Limerock] Wood, nr Wellington (Telford) SJ 65-09-
Lin Can Moss, Lower Hopton nr Ruyton XI Towns SJ 375211
Lincoln Hill, Ironbridge SJ 672038
Lindridge Farm, Tuckhill nr Alveley SO 791867
Linley nr Astley Abbotts SO 68-98-
Linley (Hall) nr More SO 346929
Linley Hill nr Norbury SO 35-94-
Linney, Ludlow SO 508752
Little Hales nr Lilleshall SJ 749158
$ Little Hereford (Herefs) SO 55-68-
Little Ness SJ 40-19-
Little Stretton SO 44-91-
Little Wenlock nr Buildwas SJ 64-06-
Little Weston, Priestweston nr Chirbury SO 294985
Lizard Hill nr Shifnal SJ 77-09-
[Llanamonerch] *see* Llanymynech
$ Llandysilio (Monts) SJ 26-19-
Llanfair Hill nr Clun SO 25-79-
Llanfair Waterdine nr Knighton SO 24-76-
Llanforda (Hall) SJ 266289
Llangollen Canal *see* Shropshire Union C
$ Llangunllo (Rads) SO 21-71-
Llanhowell nr Clunbury SO 345792
$ Llansantffraid ym Mechain nr Llanymynech (Monts) SJ 22-20-
$ Llansilin (Denbs) SJ 20-28-
Llanyblodwel SJ 23-22-
($) Llanymynech, Ll Hill and Ll Rocks (partly in Monts) SJ 26-20-, 26-21-, 26-22-
Llawnt, Rhydycroesau nr Oswestry SJ 249309
$ Llechrydau (farm and moor) nr Selattyn (Denbs) SJ 22-34-
Lloyds Coppice nr Ironbridge SJ 68-03-
Llwynygroes nr Llanymynech SJ 284206
$ Llyn Bedydd nr Hanmer (Flints) SJ 471392
Llynclys nr Oswestry SJ 28-24-
Llynclys Hill (Common) nr Oswestry SJ 27-23-
Llyn Rhuddwyn, Pentregaer nr Trefonen SJ 232288
Loamhole Dingle nr Ironbridge SJ 66-05-
Lodge, the, Overton, Richard's Castle SO 500722
Lodge Hill nr Frodesley SO 51-99-
Lodge Lake *see* Tong Lodge Lake
$ Loggerheads nr Ashley (Staffs) SJ 739359
Longden nr Shrewsbury SJ 44-06-
Longdon Orchard, Wyre Forest SO 74-77-
Longdon upon Tern SJ 62-15-
LONG MOUNTAIN SJ 20
LONG MYND (plateau) SO 49
Longner Hall nr Atcham SJ 528111
Longnor SJ 48-00-
Long Pike Hollow, Clun Forest SO 21-86-
Long Pool, The Bog nr Shelve SO 356977
Long Rough, Cothercott nr Church Pulverbatch SJ 41-00-
Longville in the Dale nr Rushbury SO 53-93-
Loppington SJ 47-29-
Lordshill, Snailbeach nr Minsterley SJ 380020
Loton Park and Deer Park, Alberbury nr Ford SJ 35-14-
Lower Hopton nr Ruyton XI Towns SJ 380210
Lubberland *see* Crumpsbrook
Luciefelde (house), Shrewsbury SJ 491118
Ludford nr Ludlow SO 51-74-
LUDLOW SO 57
Ludlow Castle SO 508746
[Lumhole] Loamhole [Pool and] Dingle SJ 66-05-
Lushcott nr Easthope SO 553953
[Lutwyche], Wenlock Edge School nr Easthope SO 557947
Lydbury North SO 35-86-
Lydebrook Dingle nr Ironbridge (Telford) SJ 65-06-
Lydehole nr Culmington SO 521820
Lydham Heath nr Bishop's Castle SO 34-90-
Lyd Hole, the, Earlsdale nr Pontesbury SJ 415055
$ Lye Head nr Bewdley (Worcs) SO 75-73-
Lye Wood nr Morville SO 673933
$ Lymore and L Pools nr Montgomery (Monts) SO 23-96-
Lyneal and L Moss nr Welshampton SJ 44-33-
Lyth Hill nr Shrewsbury SJ 46-06-
Lythwood nr Shrewsbury SJ 46-07-
M54 Motorway SJ 61, 60, 70, 80
Mad Brook SO 71-77- etc
Maddock's Hill nr the Wrekin SJ 64-08-
Madeley (Telford) SJ 69-04-
Madeley Court (Telford) SJ 695051
Madeleywood (Telford) SJ 68-03-
$ Maer Hills (Staffs) SJ 77-39-
Maesbrook nr Knockin SJ 30-21-
Maesbury and M Marsh nr Oswestry SJ 31-25-
Mainstone SO 27-87-
Malins Lee (Telford) SJ 69-08-
$ Mamble (Worcs) SO 68-71-
Manstone Rock, Stiperstones (summit) SO 367986
MARKET DRAYTON SJ 63
Marnwood Hall nr Buildwas SJ 656045
Marrington and M Dingle nr Chirbury SO 27-96-, 27-97-
Marshbrook nr Acton Scott SO 44-89-
Marsh Pool nr Shelve SO 324993
Marton and M Pool nr Baschurch SJ 44-23-
Marton Pool nr Chirbury SJ 295027
$ Mary Knoll and M K Valley, Bringewood Chase (Herefs) SO 48-73-
Mawley (Hall) nr Cleobury Mortimer SO 68-75-
Meadowtown nr Worthen SJ 31-01-
Medlicott nr Wentnor SO 400946
($) Meese, R (partly in Staffs) SJ 72, 62
Meeson and M Heath nr Waters Upton SJ 65-20-
Melverley SJ 33-16-
Meole Brace nr Shrewsbury SJ 48-10-
Meole Brook *or* Money Brook *is* Rea Brook in Shrewsbury
Mere, the, Ellesmere SJ 40-34- etc
Mere Pool, Shrewsbury SJ 511107
Merrington and M Green SJ 47-21-
Middlehope nr Diddlebury SO 49-88-
Middle Pool, Steadvallets nr Bromfield SO 465762
Middleton nr Ludlow SO 53-77-
Middleton, Priestweston nr Chirbury SO 297990
$ Middletown Hill (Monts) SJ 30-13-
Mill Brook SO 67
[Mill Glen] *see* Cardingmill Valley
Millichope Park nr Munslow SO 52-88-
Milson and M Wood SO 63-72-
Minsterley SJ 37-05-
Minton nr Little Stretton SO 431907
Minton Batch, Long Mynd SO 41-91- etc
Mitchell's Fold (stone circle), Stapeley Hill SO 305984
Moat Hill nr Bishop's Castle SO 29-89-
Moelydd nr Trefonen SJ 24-25-
$ Moel y Golfa (hill) nr Middletown (Monts) SJ 291125
Mogg Forest nr Easthope SO 560940
Money Brook *see* Meole Brook
Monkhopton SO 62-93-
$ Monksfields (farm), Long Mountain (Monts) SJ 295088
Montford SJ 41-14-
Montford Bridge SJ 43-15-
$ MONTGOMERY (Monts) SO 29
Montgomery[shire] Canal *see* Shropshire Union C
Mor Brook SO 69 etc
Morda, R SJ 23, 22, 32
[Morda Pool] nr Oswestry SJ 290280

More SO 34-91-
$ Moreton and M Moors (Staffs) SJ 78-17-
Moreton Corbet SJ 55-23-
Moreton Hall (school) nr Western Rhyn SJ 296357
Moreton Say SJ 63-34-
[MORFE, FOREST OF] SO 78, 79
Morlas Brook SJ 23, 33
Morris's Bridge, S U Canal nr Whixall SJ 494354
Morton, Llynclys nr Oswestry SJ 29-24-
Morton Pool, Redwith nr Knockin SJ 302240
Morville SO 67-94-
Mosterley nr Cound SJ 560027
MUCH WENLOCK SO 62-99-
$ Mucklestone (Staffs) SJ 72-37-
Muckleton Moss nr Shawbury SJ 59-22-
Mucklewick Hill nr Shelve SO 331971
Muckley and Mcross nr Acton Round SO 64-95-
Munslow SO 52-87-
Munslow Aston SO 51-86-
Muxtonbridge Farm, Muxton (Telford) SJ 725133
Myddle SJ 46-23-
Mynydd Myfyr nr Trefonen SJ 24-27-
Myndtown nr Wentnor SO 390895
Mytton nr Montford Bridge SJ 443170
Myttonsbeach (valley), Stiperstones SJ 36-00-
Nantmawr nr Llanyblodwel SJ 25-24-
Nantygollen nr Trefonen SJ 245289
Napp, the, Pennerley nr Shelve SO 351994
Nash and N Court SO 60-71-
Neach Hill nr Albrighton SJ 790063
Neachley Pool, Ruckley nr Shifnal SJ 784060
Neen Savage SO 67-77-
Neenton SO 63-87-
Ness *see* Great Ness and Little Ness
Nesscliff and N Hill nr Great Ness SJ 38-19-
Netchwood nr Monkhopton SO 61-92-
Netherwood Coppice nr Church Preen SO 540990
New Bridge, Vyrnwy SJ 253196
Newcastle (on Clun) nr Clun SO 24-82-
New Caynton Mill nr Edgmond SJ 695230
New Hadley (Telford) SJ 68-11-
New Invention nr Clun SO 294767
[New Park], Shrewsbury SJ 49-13-
$ New Pieces, Breidden Hills (Monts) SJ 29-13-
New Pool, Coalbrookdale nr Ironbridge SJ 673049
New Pool nr Little Ness SJ 415183
New Pool (resr), Long Mynd SO 436946
NEWPORT SJ 71
Newport Canal *see* Shropshire Union C
Newton Mere nr Welshampton SJ 425342
Nick Knolls nr Hope SJ 340004
Nills Hill nr Pontesbury SJ 395050
Nind nr Shelve SO 334961
Nipstone Rock, Stiperstones SO 357970
Nobold nr Shrewsbury SJ 473102
Norbury SO 36-92-
Norbury Junction (S U Canal) SJ 793228
Nordley Common [?Norley Green] nr Linley SO 68-97-
Nordybank (hillfort), Brown Clee Hill SO 57-84-
$ North Wood nr Bewdley (Worcs) SO 78-77-
Northwood nr Wem SJ 46-33-
Norton SJ 72-00-
Norton Camp (hillfort) and N C Wood nr Stokesay SO 44-81-
Norton in Hales SJ 70-38-
Norton Mere, Tong Norton SJ 79-08-, 79-09-
Nortons End nr Highley SO 719827
Novers, the, (wood) nr Hope Bagot SO 59-73-
Nox nr Shrewsbury SJ 412104
Nursery, the, West Felton SJ 347259
$ Oaf's Orchard, Fenn's Moss (Flints) SJ 48-36-
Oakeley [Oakley] Wood nr Bishop's Castle SO 34-88-
Oakengates, Telford SJ 70-10-
Oakly [Oakley] Park nr Ludlow SO 48-76-
Oaks Hall nr Pontesbury SJ 423056
Oaks Wood nr Pontesbury SJ 41-04-
Offa's Dyke (ancient earthwork) SO 27, 28, 29; SJ 20, 22, 23 etc
$ Ogof, the, (cave) on Llanymynech Hill (Monts) SJ 266222
Old Caynton *see* Caynton
$ Old Church Stoke nr Church Stoke (Monts) SO 28-94-
$ Old Mills Hill, Breidden Hills (Monts) SJ 290131
Old Oswestry (hillfort) SJ 296310
Oldpark (Telford) SJ 68-09-
Oldport nr Oswestry SJ 299308
Old Race Course nr Oswestry SJ 25-30-
Old Rectory Wood, Church Stretton SO 450939
Old River Bed nr Shrewsbury SJ 49-14-
Old Wood, Merrington nr Myddle SJ 46-20-
Ollerton nr Child's Ercall SJ 65-25-
[Olympian field], Linden Field, Much Wenlock SJ 625005
Onibury SO 45-79-
Onny, R SO 39, 38, 48, 47
Onslow (Hall) nr Shrewsbury SJ 436129
Oreton and O Common nr Farlow SO 65-80-
OSWESTRY SJ 22
Oteley [Otley] (Park), Ellesmere SJ 41-34-
Overley and O Hill nr Wellington SJ 61-10-
$ Overton (on Dee) (Flints) SJ 37-41-
Oxon Pool nr Bicton SJ 454139
Pant nr Llanymynech SJ 27-22-
Pantglas nr Oswestry SJ 26-32-
[Paper Mills], Ludlow SO 523737
Paradise and Dale Coppice, Coalbrookdale SJ 67-04-
$ Park Farm nr Bewdley (Worcs) SO 777743
$ Patshull Hall nr Albrighton (Staffs) SJ 802009
Paulith Bank nr Habberley SJ 400006
$ Paytoe nr Adforton (Herefs) SO 413715
$ Pedwardine nr Brampton Bryan (Herefs) SO 36-70-
Pell Wood, Totterton nr Lydbury North SO 36-87-
[Penally] *see* Pennerley
$ Penley (Flints) SJ 41-39-
Pennerley nr Shelve SO 35-99-
$ Pensax (Worcs) SO 72-69-
Pentre nr Nesscliff SJ 36-17-
Pentregaer nr Trefonen SJ 23-28-
Penycoed, Llynclys Hill nr Oswestry SJ 270230
$ Pen y Gwely (summit) nr Llechrydau (Denbs) SJ 212337
Penyllan nr Oswestry SJ 280286
Peplow nr Hodnet SJ 63-24-
Perkins Beach (valley), Stiperstones SJ 370000
Perry, R SJ 33, 32, 42, 41
Perthy and P Pool nr Ellesmere SJ 36-33-
Petton and P Park SJ 43-26- etc
Picklescott nr Woolstaston SO 43-99-
Pikes End Moss nr Colemere SJ 442317
Pim Hill nr Myddle SJ 48-21-
Pitchford SJ 53-03-
Plaish nr Church Preen SO 530960
$ Plas y du nr Church Stoke (Monts) SO 285938
Plealey nr Great Hanwood SJ 42-06-
Plowden and P Woods nr Lydbury North SO 37-86-
Pole Bank, Long Mynd SO 415944
Poles Coppice nr Pontesbury SJ 390045
Polmere nr Nox SJ 413093
Pontesbury SJ 39-06- etc
Pontesford nr Pontesbury SJ 41-06-
Pontesford Hill nr Pontesbury SJ 40-05-
Pontfaen nr Chirk SJ 280370
$ Pont y Pentre nr Llansantffraid (Monts) SJ 217198
$ Pool Quay nr Guilsfield (Monts) SJ 25-11-
Pool's Dam, Wenlock Abbey SJ 626000
Porthywaen, Llynclys nr Oswestry SJ 26-23-
Posenhall nr Broseley SJ 65-01-
Poughnhill nr Caynham SO 540737
$ Pound Green nr Buttonoak (Worcs) SO 75-78-
$ Powis Castle nr Welshpool (Monts) SJ 21-06-
Pradoe nr West Felton SJ 35-24-
Prees SJ 55-33-
Prees Canal *see* Shropshire Union C
Prees (Higher) Heath SJ 56-36-
Prescot(t) nr Baschurch SJ 42-21-
Presthope, Wenlock Edge SO 58-97-
Preston (P Boats) nr Uffington SJ 529119
Preston Gubbals [Gobald] nr Shrewsbury SJ 49-19-
Preston Montford (Field Centre) nr Montford Bridge SJ 433143
Preston Rough, Preston Montford nr Montford Bridge SJ 43-14-
Preston Springs (wood) nr Lee Brockhurst SJ 53-26-
Priestweston nr Chirbury SO 29-97-
Priors Halton nr Ludlow SO 49-75-
Priorslee and P Hall (Telford) SJ 71-09-
Prizeley nr Cleobury Mortimer SO 697749
Prolley Moors nr Wentnor SO 39-92-
Puleston Bog and P Common nr Chetwynd SJ 73-23-
Pulley and P Common nr Shrewsbury SJ 47-09-
Pulverbatch, Castle and Church SJ 42-02-, 43-02-
Purlogue, New Invention nr Clun SO 28-76-
Quarry, the, (park) in Shrewsbury SJ 487124
Quatford SO 73-90-
Quatt nr Bridgnorth SO 75-88-
Queen's Head [turnpike] nr West Felton SJ 33-26-
Quina Brook nr Wem SJ 524330
Quinny Brook SO 49, 48
Radbrook House, Shrewsbury SJ 474119
Ragleth Hill nr Church Stretton SO 45-92-
Ratlinghope SO 40-96-
Rea Brook and R SO 67, 68
Rea Brook and Valley SJ 30, 40
$ Red Bridge (S U Canal), Wern nr Arddleen (Monts) SJ 251141
($) Redbrook (partly in Flints) nr Whitchurch SJ 51-41-
Redhill, Hookagate nr Shrewsbury SJ 469096
Redhill nr St George's (Telford) SJ 728109
Redlake nr Oakengates SJ 683105
Redlake, R SO 37
Rednal(l) Mill nr Hordley SJ 37-29-
Rednal(l) Moss nr Queen's Head SJ 34-27-
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Addendum

p. 219
Whitebeams
Sorbus spp.

40 fruiting specimens, collected recently (October 1984) from Craig Breidden by Dr G B Wilson and representing more than half the total population there, have been submitted to P D Sell at Cambridge. Mr Sell considers the material inadequate for critical determination, but has provisionally identified the following: *S. anglica* 30%, *S. leptophylla* 5%, *S. porrigentiformis* 45%, *S. rupicola* 12%. Mr Sell has also examined a specimen collected in 1974 by FHP from old mine workings at Wombridge, Telford. He describes it as "an unnamed *Sorbus* to which I intend to give the epithet *croceocarpa*."

"This is no ordinary Flora," writes David Bellamy in his foreword, "no simple list of plants: it overflows with the knowledge of experts who are able to communicate their own excitement in the subject. It recognises and describes plants as living members of living communities with which we must learn to share the countryside."

This *Ecological Flora of the Shropshire Region* ranges beyond the county boundary to include interesting and important parts of neighbouring counties, especially on the Welsh side.

It is at least three books in one. The first part deals with the background – the organisation of the nine-year project involving more than 100 enthusiasts; fascinating biographical sketches of former naturalists; a full account of the region's climate, geology, soils and land-use, past and present; and the place of this small region in the broader picture of plant geography on the continental scale.

Part Two describes the amazingly varied habitats and plant communities found in the region, from hill-springs to rivers, mires to meres, claypits to canals; rocks, heaths and grassland; woods and hedges; quarries and cornfields; lane-sides and motorway verges. A chapter on ecological change stresses the need for facts and a historically balanced judgement in the debate on conservation priorities.

Part Three is the 'conventional' local Flora, but even this is packed with ecological information, the study of "what grows where, and why". Although fairly technical in places and full of detail, this book will have a wider appeal than to the student and the dedicated botanist alone. There is something in it to interest the farmer and the forester, the planner and the engineer, the weekend garder and the country-lover.

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The Shropshire Wildlife Trust

The Trust, founded in 1962, is vitally concerned with the discussion of countryside and conservation matters throughout Shropshire. It also surveys and monitors important wildlife areas and encourages their proper management through personal contact with farmers, landowners, local authorities and others. The Trust manages 20 nature reserves, most of which are open to members. Membership details are available from The Director, Shropshire Wildlife Conservation Centre, 167 Frankwell, Shrewsbury SY3 8LG.

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